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SEVENTEEN YEARS OF AIR DEFENSE

(Unclassified)



HISTORICAL REFERENCE PAPER NO. 9

NORTH AMERICAN AIR DEFENSE COMMAND

SEVENTEEN YEARS OF AIR DEFENSE

**Historical Reference Paper
No. 9**

1 Aug 1945

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**Directorate of Command History
Office of Information**



FOREWORD

This is a brief, general history of air defense from the end of World War II to early 1963. It replaces Historical Reference Paper No. 5, Fifteen Years of Air Defense, 1 March 1962. Its purpose is to provide an orientation history for officers newly assigned to air defense and to provide a handy reference to the development of air defense.

This paper is organized in such a manner as to show the growth of the physical systems and the changes thereto and the growth of unity of direction in air defense. The first three chapters cover systems development; the last three cover the development of COMAD and HMMAD.

Colorado Springs, Colorado
1 June 1963

J. H. Buss
L. E. Buss
Director of
Command History



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Chapter One

START OF POST-WAR AIR DEFENSE

1946 - 1952

AIR DEFENSE TO THE KOREAN WAR

Air defense of the North American continent was a relatively minor undertaking from the end of World War II to mid-1950. At the end of the war, the U.S. felt secure with its atomic monopoly and long-range bombers. This fact plus demobilization resulted in air defense receiving little attention and few resources.

However, a start was made. In March 1946, the Army Air Force established the Air Defense Command at Mitchel Field, New York, under Lieutenant General George E. Stratemeyer. To defend the country, he was given four fighter squadrons, a few radars, and an organization of six numbered air forces, only two of which were active. Up in Alaska, the AAF reorganized what was left of its men and equipment into the Alaskan Air Command in December 1945 at Davis Airfield (it moved to Elmendorf in 1946), under Brigadier General Edmund C. Lynch. AAC had two radar squadrons and three interceptor squadrons in 1946, about as large a force as that of ADC.

Alaskan air defense was made the responsibility of a JCS unified command, Alaskan Command, which was established in January 1947, under Major General Howard A. Craig. However, AAC was delegated the tasks of planning and executing the air defense mission. Army and Navy component commands, U.S. Army Alaska (USARAL) and Alaskan Sea Frontier, were formed in November 1947.

In Canada, there was no separate organization charged with air defense responsibility until 1 December 1948. An Air Defence Group was set up on



this date as a separate organization within Headquarters RCAF at Ottawa. The group moved to RCAF Station St. Hubert the following year.

No other air defense organizations were formed prior to mid-1950.

Meanwhile, at ADC Headquarters work was going ahead in an effort to organize and build an air defense system. Early in 1947, ADC organized its West Coast radars into four squadrons and established the first post-war AC&W group, the 505th, at McChord AFB, Washington. Early the next year, it formed a second group on the East Coast.

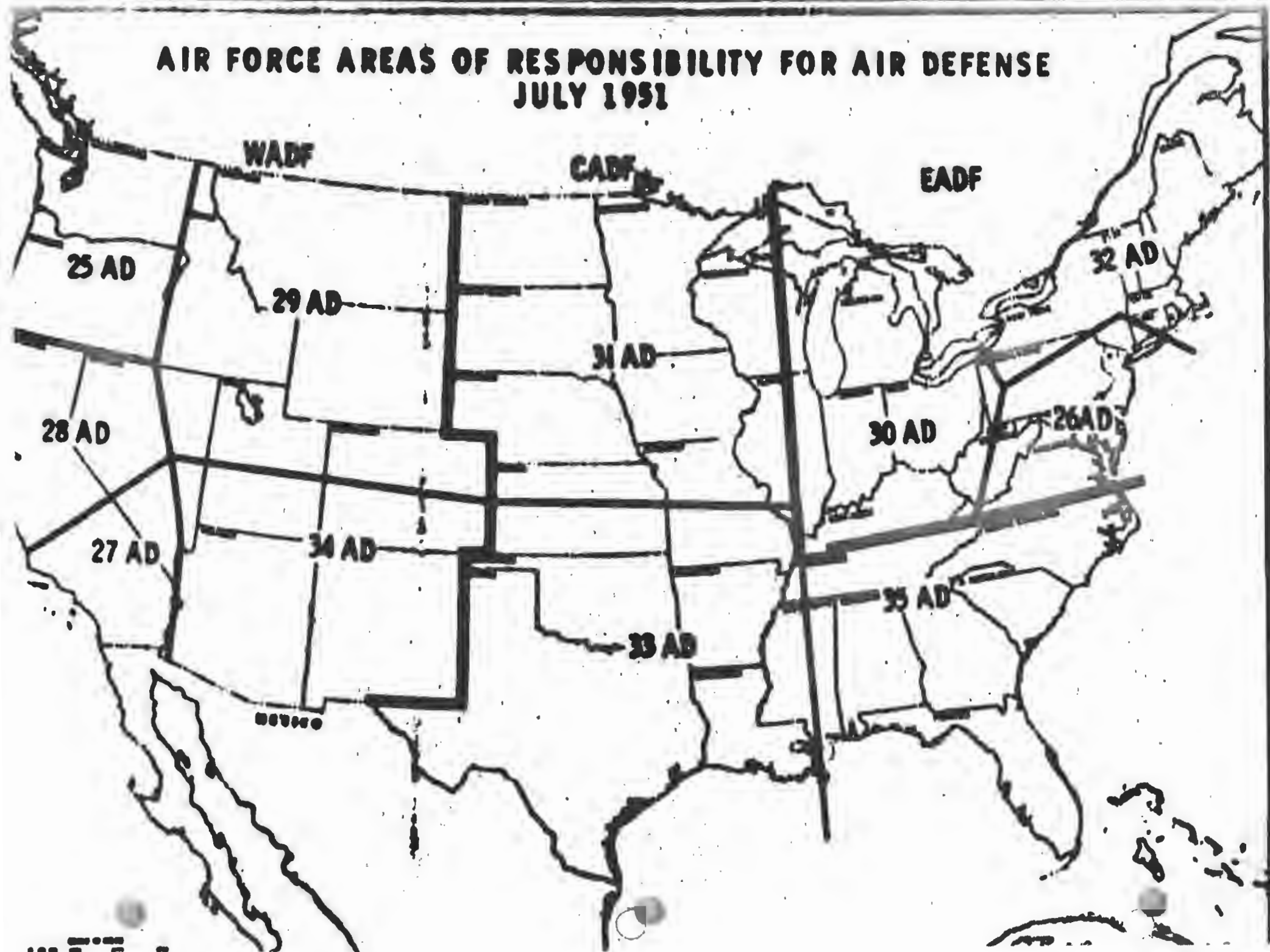
About this time, Air Force headquarters, spurred by crises in the world, decided to erect a temporary network using World War II radars. By the time of the Korean War, June 1950, ADC had a system of 44 stations operating. In Alaska, AAC set up a five-station temporary system by the latter date. Canada had three radars operating as of April 1950.

Earlier, in March 1949, Congress had approved an Air Force request for funds to build a new radar system for the U.S. and Alaska. This program was to provide 75 stations and ten control centers in the U.S. and ten stations and two control centers in Alaska. These stations were called Permanent System stations to distinguish them from the temporary net stations mentioned above. The operational target date for the P-System was mid-1952.

The Air Force also turned its attention to the problem of poor coverage at low altitude and tested a civilian spotter system in 1949. Formal approval was given by USAF on 1 June 1950 to set up a Ground Observer Corps network of 26 filter centers and their associated observation posts.

Interceptor strength rose slowly also during these years. In the U.S., the force increased

AIR FORCE AREAS OF RESPONSIBILITY FOR AIR DEFENSE JULY 1951





RCAF Mustangs



USAF F-82



F-94A

EARLY POST-WAR INTERCEPTORS



from four squadrons in 1946 to 23 squadrons at mid-1950. AAC's force increased to four squadrons by that time. The aircraft in use were propeller-driven types and day jets mostly. There were also a few F-94A's in use, an early radar-equipped jet. Canada's first post-war interceptor squadron was formed in December 1948. A second squadron was added the next year.

In the meantime, in the U.S. in 1948, USAF tried out a means of pooling resources to increase the force available by placing TAC and ADC under a new command, the Continental Air Command. The latter eventually took over direction of the air defense effort and in 1949, ADC was reduced to record status and on 1 July 1950 was abolished.

Army antiaircraft was not significant in air defense prior to 1951. Until early 1950, there were no units assigned primarily to air defense in the continental U.S. And then the only AA units on site were at the Soo Locks and the Hanford AEC installation. However, even at this time, the Army was working on establishment of a national organization for employment of AA in air defense and a number of studies were underway. In Alaska, USARAL had three AA battalions by mid-1950.

Thus, the assigned air defense force at the start of the Korean War on the North American continent consisted of 29 interceptor squadrons, 62 F-94's, and a few antiaircraft units. The foundation was laid, however, and many plans were made and programs underway for the build-up to come.

KOREAN WAR TO 1952

The Korean War marked a turning point in air defense as it did military preparedness in general. The Korean War followed a long series of crises and threats that included the fall of Czechoslovakia,



the Berlin Blockade, and the Russian explosion of an atomic bomb in 1949. Now there was suddenly a hot war and the lid on preparedness came off.

On 27 June 1950, both the Continental Air Command and the Alaskan Air Command began 24-hour operations. Around-the-clock operation of the air defense system dates from this time. ADC was reactivated on 1 January 1951 and opened at Colorado Springs, Colorado, on the 8th. A few months later, 21 Air National Guard fighter squadrons were federalized and assigned to ADC, doubling its interceptor strength. And in July 1951, a second major radar program was approved for ADC by USAF (the first was the Permanent System). Given the name Mobile Program (because the initial idea, later dropped, was to deploy mobile radars), it provided first for 44 radars.

The Army, which had been considering the establishment of an air defense organization, formed the Army Antiaircraft Command (ARAACOM) on 1 July 1950 at the Pentagon under Major General Willard W. Irvine. In January 1951, ARAACOM Headquarters moved to Colorado Springs to operate alongside ADC Headquarters. ARAACOM received assignment of 23 gun battalions in April 1951 and increased in strength to 45 battalions by the end of the year, much of the increase (ten battalions) coming from the National Guard.

In Canada, the Air Defence Group was redesignated the Air Defence Command on 1 June 1951 and placed under Air Vice Marshal C. R. Dunlap. By this time, the U.S. and Canada had worked out preliminary arrangements for a proposed radar extension plan (later termed the Pinetree Plan) that would build 33 radar stations in Canada. Formal agreement was concluded with an exchange of notes on 1 August 1951. The 33 stations were to stretch in a line across southern Canada and up the eastern coast. The U.S. was to finance 22, Canada 11. Manning and operation was also to be divided. The Northeast Air Command (see below) was to man nine



(Top)- 90mm

(Bottom) - 120mm





of the stations in its area, USAF ADC was to man eight stations along the southern Canadian border, and RCAF ADC was to man the other 16 stations. To provide coverage until the Pinetree radars started operating, Canada set up a five-station temporary system.

RCAF ADC's interceptor force was brought to a total of six squadrons by the end of 1951. ADC's squadrons were equipped with Vampire, Mustang or Sabre aircraft.

A final part of this build-up effort was made in the area termed the Northeast, which included Newfoundland, Labrador, Northeastern Canada, and Greenland. On 1 October 1950, the JCS established the U.S. Northeast Command at Pepperrell AFB, St. Johns, Newfoundland, to provide more direct operational control by the JCS over U.S. forces in Canada and Greenland. USNEC's mission was to defend the U.S. from attack through the arctic regions in the northeast area, defend the USNEC area, and support other agencies using Northeast bases. Also, on 1 October, USAF established the Northeast Air Command at the same base, as the Air Force component of USNEC. Major General Lyman P. Whitten was named commander of both organizations.

As noted above, NEAC's permanent radars were part of the Pinetree System, with the exception of three radars in Greenland. As in other areas, while the permanent net was being built, a temporary system was set up. This consisted of five stations, none of which were operational before early 1952. NEAC had no other air defense forces before 1952 when its first interceptor squadron arrived.



Chapter Two

BUILDING THE MANNED BOMBER DEFENSES

1951 - 1959

DEVELOPMENT - AT A GLANCE

1951 was the beginning of a period of continuous building. Having only a small force of World War II equipment, air defense had much room for expansion and change. In the next eight years, North American air defense grew and improved almost continuously. New weapons replaced the old twice during these years.

A brief comparison of forces at the beginning and end of these years illustrates the changes. At the end of 1951, the forces on the North American continent assigned to air defense consisted of 51 fighter-interceptor squadrons, 48 antiaircraft gun battalions, and 65 radar stations. At the end of 1959, the regular forces under NORAD amounted to 67 fighter-interceptor squadrons (down from a peak of 86 in 1957), 61 Nike Ajax/Hercules missile battalions, two BOMARC A squadrons, three Skysweeper gun batteries, and over 300 radar stations of all types (not including the DEW and Mid-Canada Lines and extensions).

Of course, numbers by themselves mean little. The 1951 force was in the horse-and-buggy days compared to the 1959 force. For example, the interceptors in 1951 were mainly propeller-driven planes or early day jets. A few all-weather jets, F-80B's/F-94A's, were available. But the F-94's had no de-icing equipment. Interceptors carried fixed guns -- either .50 caliber machine guns or 20mm cannons. The other forces were like in nature. The antiaircraft weapons were 40mm, 90mm and 120mm guns. The radars were World War II types, almost entirely, clustered around only the most vital target areas.

At the end of 1959, over half the interceptor force were all-weather super-sonic jets. The others were advanced models of all-weather jets, such as the F-89J and F-86L. Interceptors were armed with rockets or missiles and over a third of the U.S. aircraft were capable of employing nuclear weapons. Every important area of the U.S. and Alaska was defended with Nike missiles. About one-third of the Nike force, the Hercules-equipped units, which were deployed widely, could carry nuclear warheads. The 300-plus radar stations included 184 prime land-based sites and 114 low-altitude gap fillers in the U.S., Canada, and Alaska, plus radars in ships, planes and towers off the U.S. coasts, which provided coverage over and around the populated areas. In addition, the Distant Early Warning Line with its extensions and sea barriers and the Mid-Canada Line provided early warning to the populated areas.

GUIDING CONCEPTS

Two basic concepts guided U.S. and Canadian air defense officials in developing and planning the manned bomber air defense system. The first was the "polar-orientation" concept. This concept stated that the defenses should face or be oriented northward -- the direction from which an attack was considered most likely to come. This concept prevailed from the start of post-war air defense. Expansion of the system, therefore, was in a northerly direction.

The second concept was that there should be a progressively concentrated "defense in depth." According to this concept, an enemy should be attacked as far out as possible initially and the pressure on him increased as he neared his objectives by the employment of increasing numbers and varieties of weapons. This concept can be seen in very early plans and was fully developed by USAF ADC in mid-1953 in its requirements plan for 1954-1960. ADC's requirements for long and medium

range interceptors and long and short range missiles would, ADC's Vice Commander, Major General Frederic H. Smith, Jr. said, "enable us to carry the air battle far from the target areas and to subject the hostile forces to prolonged and decisive attrition." CONAD and NORAD adopted this concept. But lack of a truly long-range interceptor has prevented full realization.

THE RADAR NET

In keeping with the above, the radar net developed in two ways -- growth and improvement of the coverage over and around the target areas and extension northward from the target areas. The former is covered below under land-based systems and seaward extension, and the latter under early warning.

LAND-BASED SYSTEMS

As shown in the first chapter, the foundations were laid for the basic radar systems in the U.S., Canada, and Alaska by the beginning of 1951. These were the so-called Permanent System of 75 stations in the U.S. and ten in Alaska, and the Radar Extension Program or Pinetree system of 33 stations in Canada. In the U.S., ADC got its P-system stations operating by the end of 1952. Alaskan Air Command had phased over from its temporary stations to its permanent stations by early 1953, but it was about a year before all stations were operating fully. In 1954, also, all of the Northeast Air Command's permanent stations reached fully operational status. The remaining stations in Canada started coming into operation by the end of 1952 and all but two had become fully operational by mid-1954.

Thus, the basic radar system was operating in the U.S. by 1952 and by 1954 in all other areas. But even before these systems were completed, the USAF and RCAF had given attention to extending

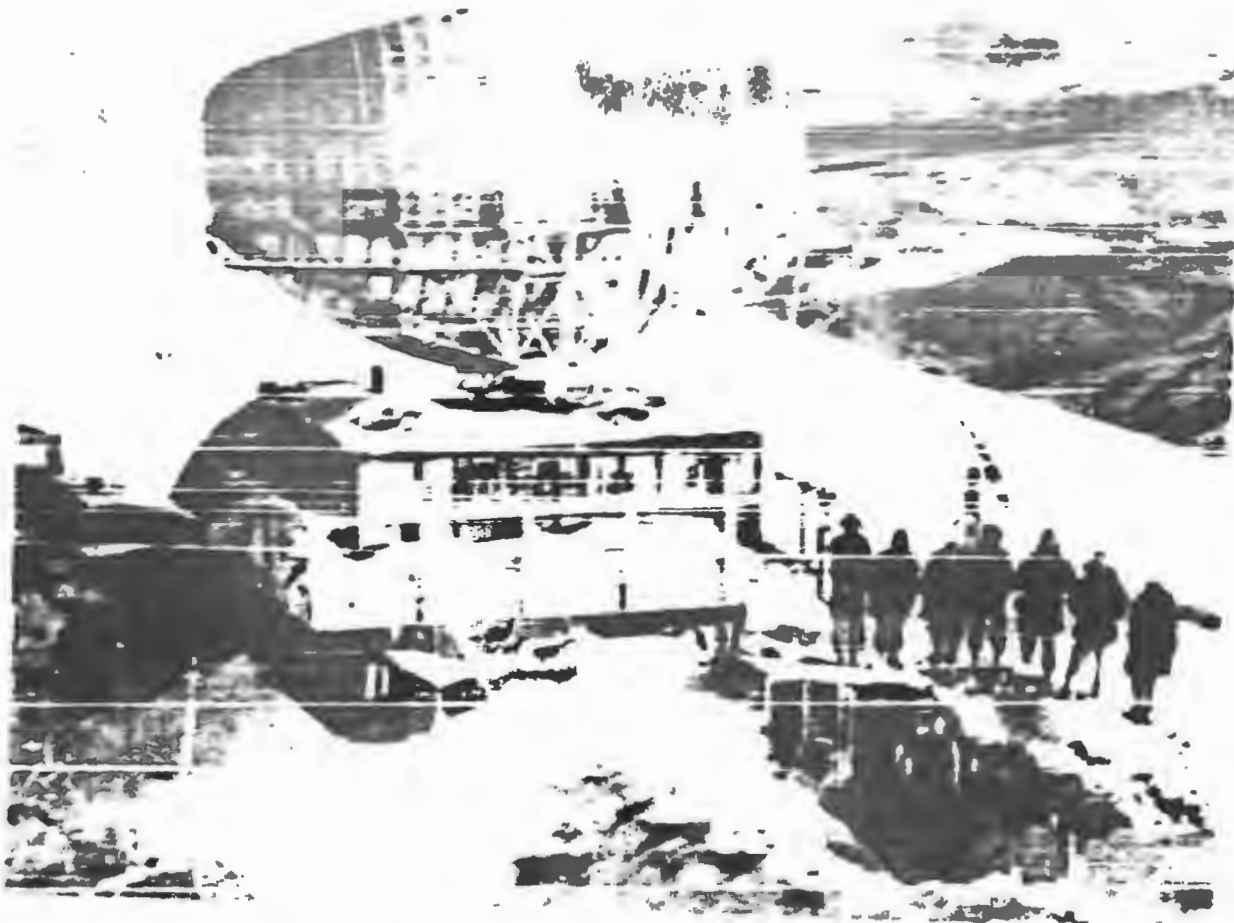
coverage and filling gaps both in geographical area and in altitude.

As stated previously, to beef up general coverage and provide protection to SAC bases, in July 1951, a second major program, the Mobile Program, was approved by USAF Headquarters. It first was for 44 radar stations. A year later, 35 more stations were added and in 1954, 29 additional. The total was not, however, the sum of these figures, for the program was revised many times. At the end of 1959, 69 stations were programmed for the U.S., 59 were operating.

A third land-based radar program for the U.S. was approved by USAF in January 1954. This provided radars that would give coverage at low altitudes and were called Gap Filler radars. Initially, ADC proposed 323 gap-filler stations but soon revised its criteria and set the goal at 235. Many revisions followed, however, and at the end of 1959, 195 stations were tentatively programmed, 108 operational.

Before the gap-filler system was effective, ADC expanded its Ground Observer Corps for low altitude surveillance. By 1954, the GOC was operating in every state of the nation. The high-water mark of the GOC was reached in December 1956 when over 18,000 posts were organized. The GOC was discontinued on 31 January 1959, by which time improved radar coverage plus increased capability of the threat made it unnecessary.

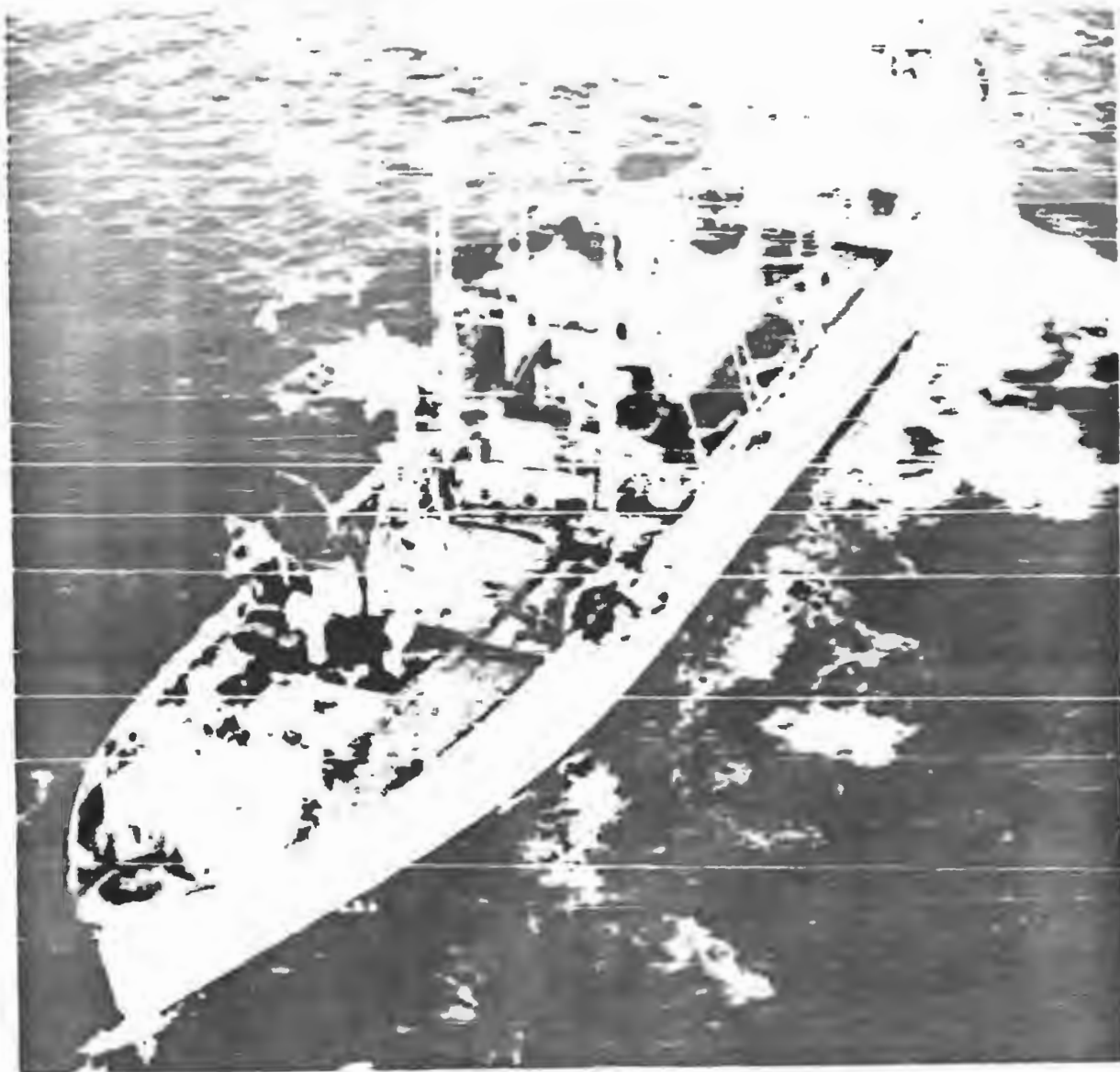
Meanwhile, additions were also being made to the systems outside the U.S. To plug gaps in the Alaskan net of ten stations, eight more were programmed by 1953. NEAC got approval in 1955 to add six gap fillers to its system. Two of Canada's original stations were removed by 1959, but three were added as part of the USAF ADC Mobile Program to make a total of 34 stations (including those in the NEAC area). Agreement had been reached by the two governments in June 1955 to build these Mobile Program stations.



CPS-5 AT SPARRE. CHN. MT., ALASKA



CPS-5 AT SPARRE. CHN. MT., ALASKA



OFF-SHORE RADAR PLATFORMS -
 Navy, Texas Tower
 Air Force



Agreement for a much more extensive program that was to be jointly financed was reached in 1959. This program, termed Continental Air Defense Integration, North (CADIN), was to provide seven prime radars, 45 gap-fillers, a SAGE CC/DC, and two BOMARC squadrons. It was also planned to tie the Pinetree radars into the SAGE system. None of the CADIN radars were operational by the end of 1959.

By 1958, improved radar was programmed for nearly every element of the surveillance system on the continent. This included the land-based prime stations, gap-fillers, the DEW Line, and the seaward extension radars. The radars that had been installed in the early 50's at the land-based prime sites, mostly FPS-3's and CPS-6B's, were highly vulnerable to ECM and inadequate by the late 50's against high-speed, very-high altitude targets. One program underway by 1958 was to modify radars to, or replace them with, FPS-20's which had much greater range and altitude. Eighty-six FPS-20's were operating by the end of 1959.

But also in 1958, USAF approved a program to replace nearly all existing radars by the mid-60's with new frequency diversity (FD) radars of various types. These had even greater range and altitude and many anti-jamming features. The FD program soon became unstable, however, due to budget cuts and technical problems and many revisions were forthcoming. The program was still shifting at the end of 1959 and none of these new FD radars were operational. The gap-filler, DEW Line, and other improvement programs were also in a state of flux at the end of 1959.

SEAWARD EXTENSION

During these years, ADC was also extending the contiguous land-based coverage out to sea off both coasts. Radar was put on every conceivable platform -- ships, planes, blimps and towers.



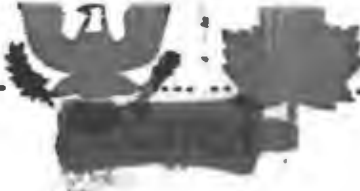
Navy picket ships were the first to carry surveillance out to sea. In 1950, following a ConAC request for ten stations, the Navy was able to offer the emergency use of two ships off the East Coast. As the Navy's capability increased, so did its support. It placed one picket ship on duty full time off the East Coast in September 1952. The next year, it agreed to provide picket ships and blimps. By July 1955, five picket ship stations were manned off the Atlantic Coast and one station off the Pacific Coast. Five off each coast were manned at the end of 1959. A blimp early warning squadron, ZW-1, became fully operational and began manning one East Coast station on 1 July 1957. This was the extent of blimp operations.

The second platforms used were Lockheed Super Constellations, designated EC-121's. An EC-121 airborne early warning and control station was manned off the Pacific Coast in August 1954 and off the Atlantic Coast in September 1955. Three eastern and four western stations were manned at the end of 1959.

Texas Tower radar platforms were suggested by the Lincoln Laboratory of MIT in 1952. USAF approved five but later cut the total to three. The first one was placed on Georges Shoal off Cape Cod and began operating in May 1956. The other two towers were operating by end-1959.

EARLY WARNING

In 1954, the U.S. and Canada approved the building of a distant early warning line in the far north. Early the following year, the JCS approved two segments of the line -- the land-based route and a western sea extension. The land portion was to run from Cape Dyer, Baffin Island, generally within about two degrees of the 69th parallel, to Cape Lisburne, Alaska. The sea extension was to run from Kodiak Island to Hawaii. This was changed before it became operational to run from Unalakleet in the Aleutians to Midway Island.



Six land-based radars were to extend coverage from the last Alaskan radar at Naknek out to Umanak. Two eastern extension routes were approved by the JCS in 1956. One was to run from Cape Farewell, Greenland, to the Azores; the other, termed the G-I-UK line, was to cross Greenland, then to Iceland, and then on to the UK. A four-station surveillance line was planned for Greenland.

Meanwhile, in 1954, Canada decided to build another early warning line at about the 55th parallel at its expense. This Mid-Canada Line had been recommended the previous year by the joint U.S.-Canada Military Study Group. The line was to run from Hopedale, Labrador, to Dawson Creek, British Columbia. The first MCL stations began limited operations in May 1957. The line was declared fully operational on 1 January 1958.

By 15 July 1957, the Distant Early Warning Line (Cape Dyer to Cape Lisburne) was declared technically ready. But many more months were required to bring the performance of the line to required standards. Limited operations on the first eastern sea extension, which ran from the Navy base at Argentia, Newfoundland, to the Azores, began on 1 July 1956. A fully operational barrier was established one year later between these points. On the latter date also, the Navy began a partial barrier in the Pacific. The latter became fully operational on 1 July 1958. It ran from Kodiak Island to Midway until March 1959 when the six Aleutian radars were operational. The northern terminal was then moved to Umanak. Both barriers were manned by Navy DER's and AEW aircraft.

THE WEAPONS

INTERCEPTORS

Until 1953, the interceptor forces were equipped with piston-engine planes and day jets, mainly. The U.S. forces began to get radar-equipped





F-94A's in 1950 and the first truly all-weather jet aircraft, the F-89B, in 1951. Less than half of the total squadrons had F-94's or F-89's at the end of 1952. Interceptor armament was fixed guns -- .50 caliber machine guns or 20mm cannons. Effectiveness against a well-defended bomber was limited by the range and lethality of the weapons and the tactic that had to be used in attacking a bomber -- the curve of pursuit.

Modernization and great increase in effectiveness came in 1953 and 1954 with the conversion to improved all-weather jet interceptors armed with rockets. USAF ADC got F-86D's, F-94C's, and F-89D's armed with 2.75" rockets. AAC's interceptor force converted to F-89D's by the end of 1954 and RCAF ADC had nine squadrons of CF-100's by the latter date. These aircraft comprised the interceptor force until 1956 when more advanced aircraft and armament began to arrive. During these years, while AAC and NEAC had F-89D's, the main part of the USAF ADC force became the single-place F-86D. In December 1955, of 1,490 interceptors in ADC, 1,041 were F-86D's.

A new round of conversions for the U.S. forces began in 1956. Of most significance was the arrival in USAF ADC of the long-awaited F-102A, the first of the supersonic "century-series" aircraft. Besides its other advantages, the F-102A was armed with the Falcon (GAR) air-to-air guided missile, an advance in armament. A Falcon-armed modification of the F-89 was also placed in ADC in limited numbers. Finally, at the very end of 1956, still another advance in armament -- to nuclear-armed missiles -- was registered with arrival of the NB-1-carrying F-89J's, another F-89 modification.

F-102A's and F-89J's went to the Alaskan Air Command and to the U.S. squadrons in the Northeast area the following year.* The RCAF had planned to

* The F-89J's in Canada were not armed with nuclear

INTERCEPTIONS OF THE MID-1950's

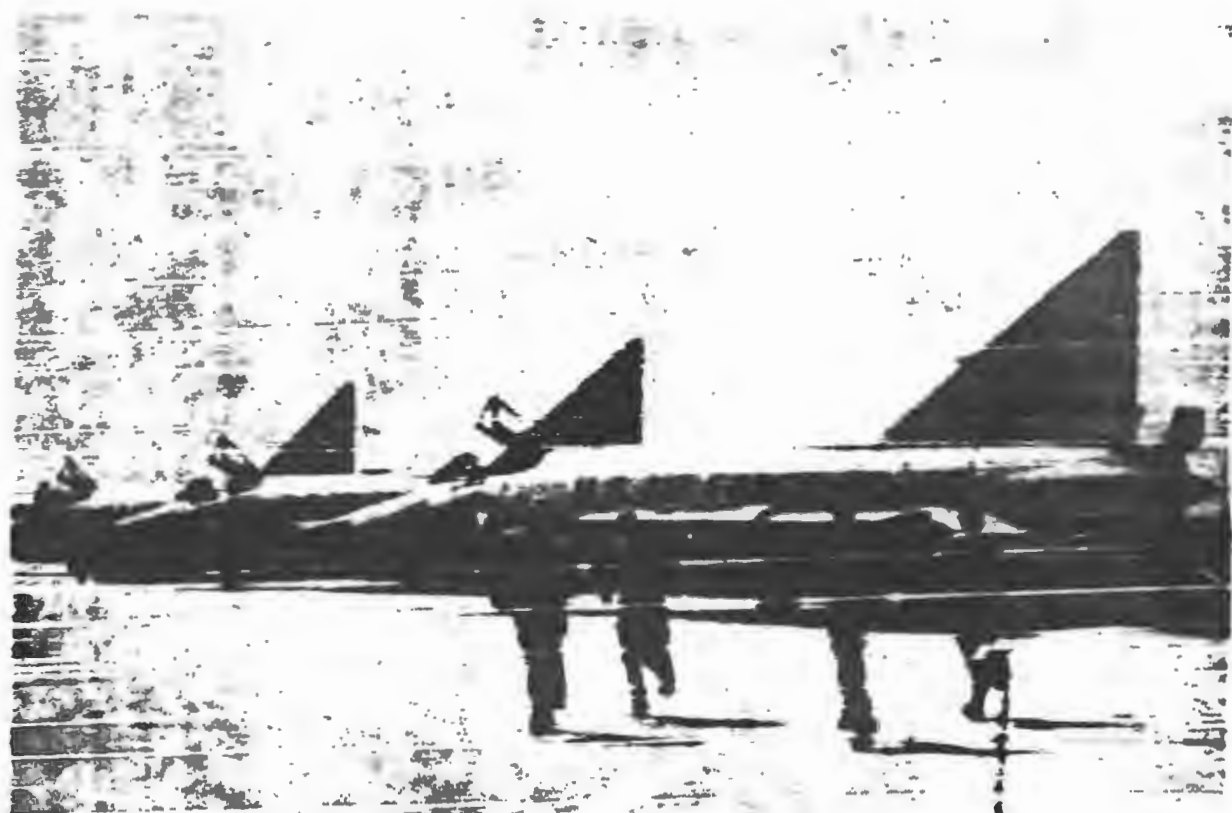


F-86D

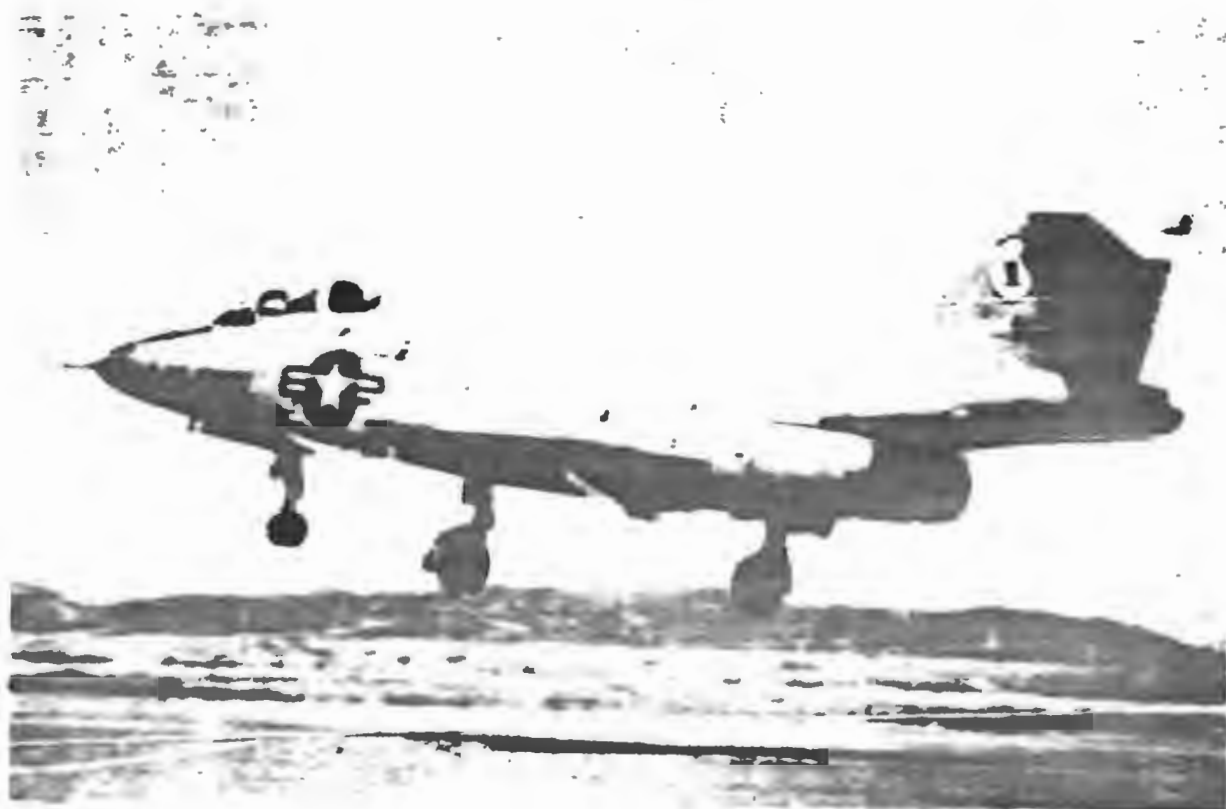


F-89D



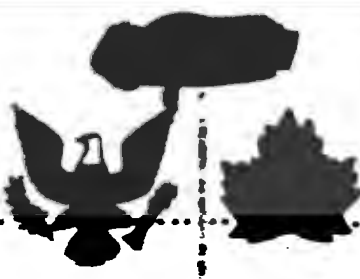


F-102A



F-101B

INTERCEPTORS OF THE LATE 1950's



replace its CF-100 Mk V's with the super-sonic CF-105, but in 1959 the latter was cancelled.

USAF ADC got three other new aircraft in the next two years. First, in January 1958, it began the receipt of four squadrons of F-104A's (removed in 1960 because they could not operate with SAGE). A year later, F-101B's began to arrive and the following May, the first F-106A's. The F-80J was the only nuclear-armed aircraft until the MB-1-armed F-101B arrived, a period of two years. The F-106A could also carry the MB-1.

In numbers of squadrons, the NORAD interceptor force reached a peak figure of 86 in late 1957. As noted earlier, the force had dropped to 67 squadrons by the end of 1959.

GUNS AND MISSILES

By the end of 1954, the Army Antiaircraft Command had reached its original goal of 86 battalions. There were four gun battalions in Alaska and one gun battalion at Thule, Greenland, by this time. Part of the force in the U.S. had Nike Ajax missiles, the first of which arrived in late 1953. By September 1955, Nike Ajax batteries outnumbered gun batteries in the U.S. Sixty-one Nike battalions was the goal. This was met by mid-1957 (244 fire units on site). Gun units for all practical purposes had been eliminated.

A great improvement began in 1958 with the beginning of conversion of all regular Army units to Nike Hercules. This missile could carry nuclear warheads and had much greater range, speed and altitude than Ajax. The first Hercules battery was operational in the U.S. in mid-1958. One Hercules battery was operational at Thule by the end of that year and eight batteries were operational in Alaska by mid-1959. Over a third of the total force had Hercules by the end of the year. One gun battalion remained, a Skysweeper unit at Sault Ste. Marie, Michigan.



The Air Force's BOMARC missile became operational first in 1959. In September, the first missile squadron (McGuire AFB, New Jersey) became operational with IM-99A's. A second squadron became operational by year's end.

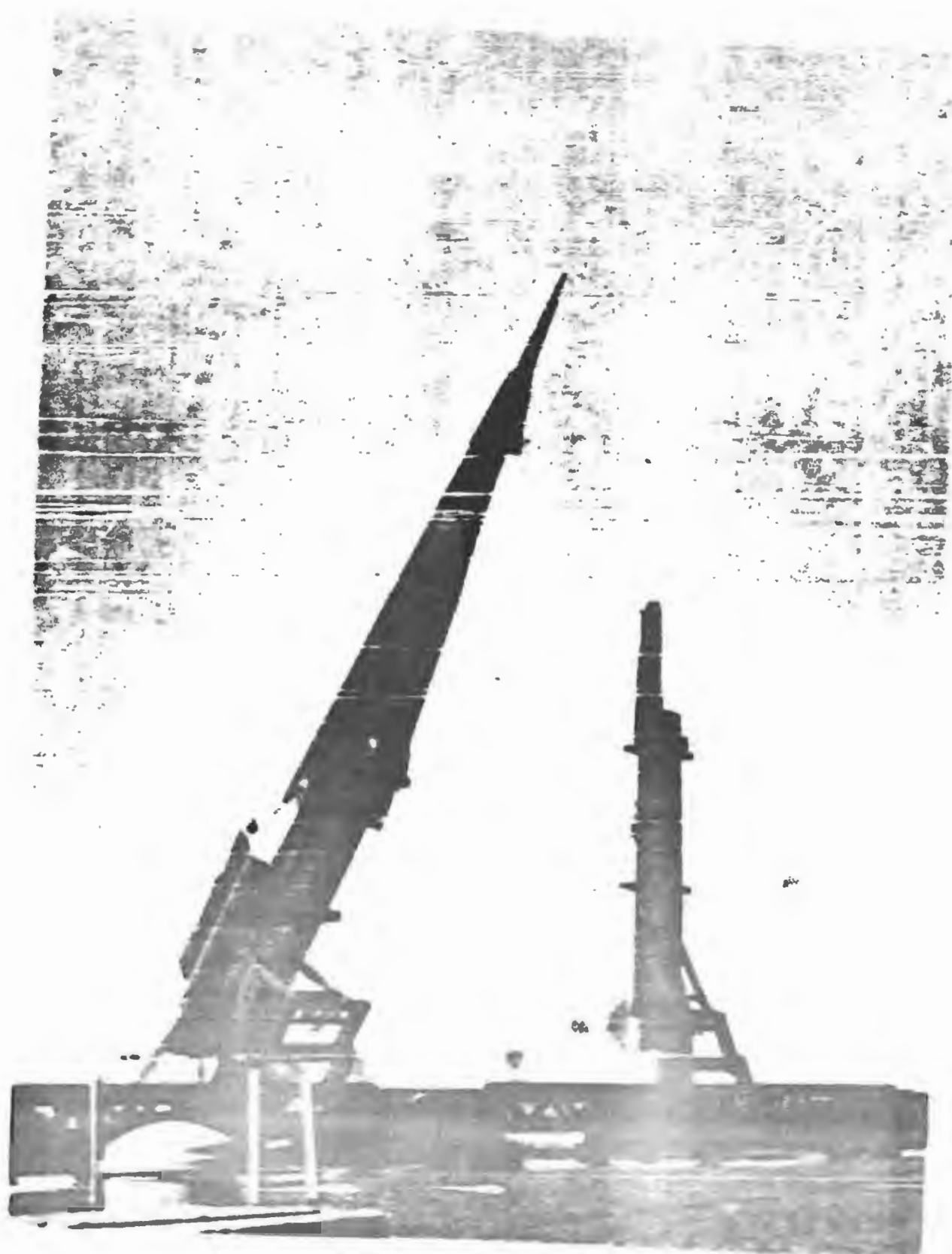
SAGE AND ORGANIZATION

By mid-1951, the USAF ADC had established an organization of 11 air divisions and three defense forces. As its system grew beyond the 75 radar stations of the P-System and its fighter forces increased, ADC decided that it needed five more divisions for a proper span of control.

In the meantime, work was going on to develop a system to automatize the ground control functions. It had been recognized very early that the manual system of observing, telling and plotting was inadequate. In mid-1950, the Continental Air Command had proposed to USAF a development program for an automatic system. USAF agreed and a number of agencies worked on the problem, among which was the Lincoln Laboratory of M.I.T. That agency developed the system adopted by the Air Force in April 1953, known first as the Lincoln Transition System, then as the Semi-Automatic Ground Environment (SAGE) System.

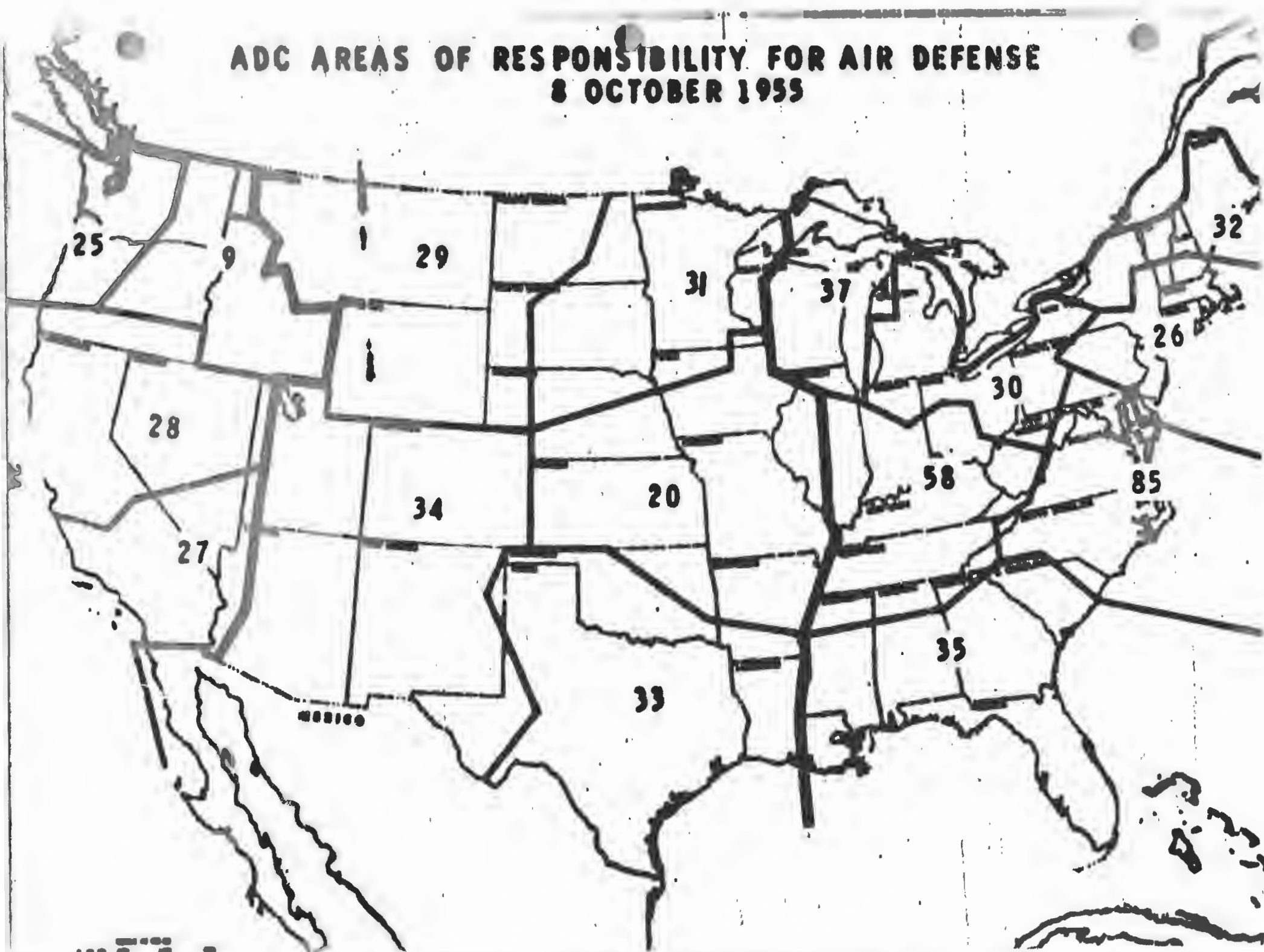
Under SAGE, not as many divisions would be needed as ADC had thought necessary before. But because SAGE would not be coming in until later, ADC decided to build up to its planned 16 divisions and then reduce gradually to seven -- the number thought needed under SAGE. Build-up to 16 divisions was accomplished by October 1955.

The first SAGE sector, New York, became operational on 26 June 1958; the first SAGE region/division, the 26th at Syracuse, New York, became operational on 1 January 1959. In order to accommodate SAGE, ADC and NORAD/CONAD began a reorganization of their structures within the U.S. at



(Left) - NIKE HERCULES (Right) - NIKE AJAX

ADC AREAS OF RESPONSIBILITY FOR AIR DEFENSE
8 OCTOBER 1955





mid-1958. Boundaries had to be realigned, regions/divisions discontinued, and new SAGE regions/divisions and under them sectors established or designated. As planned, ADC reduced its structure from 16 divisions to seven divisions by July 1960 (and discontinued its defense forces). NORAD/CONAD established seven regions in the U.S. by that time by eliminating its geographically-designated regions and redesignating seven of its divisions as regions. The U.S. Army Air Defense Command (ARADCOM was redesignated on 21 March 1957) replaced its Eastern, Central and Western Commands with five regional commands in 1955 and 1956. At the end of 1959, ARADCOM planned to establish two new regions and realign boundaries to match the ADC-NORAD/CONAD structure.

In the meantime, in late 1958, ADC had proposed adoption of a new, greater-capacity SAGE computer. Both NORAD and USAF approved. ADC planned to install the new computers at nine division combat centers in the U.S. and one in Canada. ADC wanted to "harden" each of the combat centers, which were termed "super combat centers," or SCC's, at the time. As will be shown, the SCC plan was cancelled, however.

The CADIN program, mentioned earlier, provided for SAGE in Canada. One SAGE sector was to be located in Canada (ten others extended into Canada), the Ottawa Sector, with headquarters at North Bay, Ontario. This facility was to be hardened and serve as the combat center for the Northern NORAD Region Headquarters also to be located there. The North Bay CC/DC was scheduled for operation in the fall of 1963.

MANXED BOMBER DEFENSE PROGRAM CHANGES

During the 1950's, there had been almost continuous expansion and improvement of the manned bomber defense system. But by 1959, a shifting emphasis from the manned bomber to the ballistic



missile threat, budget limitations, and a matching of funds against changing priorities slowed expansion and improvement in terms of what had been planned. In 1959 and early 1960, numerous changes were made in the programs. Mainly, these changes cut back or cut out low air defense equipment to be used against the manned bomber. But both quality and quantity were affected.

First off, in June 1959, the Secretary of Defense issued the Continental Air Defense Program (CADP), establishing objectives for continental U.S. air defense.* The CADP levels were far below what had been asked by NORAD in its objectives plan for 1959-1963, issued in December 1958, and considerably below what had been programmed or planned by the Services. Major CADP levels were these: 44 interceptor squadrons by FY 1963, 16 BOMARC squadrons (29 were programmed at the time), and 139 Nike Hercules batteries.

Other cuts followed. By the end of 1959, USAF cancelled the F-108 long-range interceptor with which NORAD had planned to equip 20 squadrons, deferred all action on a new hardened Combat Operations Center, cancelled improvements to DEW Line radars, cancelled the requirement for an advanced AEW&C aircraft, and eliminated gap fillers from the Alaskan program. The Navy deferred modernization of its AEW barrier aircraft and announced withdrawal of its picket ships from the barriers in early 1960.

1960 brought more cuts. The major items: BOMARC was reduced to eight squadrons in the U.S., USAF interceptor squadrons were to be cut to 42 by end 1964, the SAGE super combat center program was cancelled, SAGE integration equipment for AEW&C aircraft (ALRI) was limited to 35 aircraft, and the PD and gap-filler programs were reduced

* The CADIN program for Canada was not included.

Chapter Three
AEROSPACE DEFENSE

DEVELOPMENT - 1960-1963

Budget limitations and the continued increase in importance of the ballistic missile and space threats were reflected in the way the defenses developed in the first years of the 1960's:

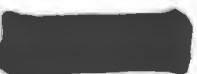
(1) Ballistic missile and space surveillance systems came into operation and counter missile and space weapons were being urgently sought. By 1960, NORAD was listing an AICM capability as its first priority for the allocation of resources.

(2) The manned bomber defenses continued to improve qualitatively. But much of the new equipment that had been planned or programmed was reduced in quantity or eliminated. Numerical growth all but stopped and by 1963, force levels had either reached full programmed strength or were dropping.

(3) A major effort was placed on providing flexibility and survivability for the defenses and by 1963 a number of means, such as backup control and weapons dispersal, had been adopted.

MANNED BOMBER DEFENSE

INTERCEPTORS

NORAD's interceptor force continued to decrease in number, going from 67 squadrons at the beginning of 1960 to 46 squadrons by May 1963, a drop of 21 squadrons (and about half of the peak 



strength of 86 in 1957). But the regular force had become completely equipped with supersonic aircraft and most of the force was capable of employing nuclear weapons. USAF ADC completed conversion to supersonic aircraft, phasing out the last F-86 and F-89 aircraft by the end of 1960 (leaving it with F-101's, F-102's, and F-106's). The nine RCAF ADC CF-100 squadrons were replaced with five squadrons of CF-101's, all of which were operational by the end of 1962.* AAC phased out its lone F-89 squadron in late 1960, leaving one enlarged F-102 squadron.

The F-101's and F-106's could carry the nuclear-tipped MB-1 missiles. These aircraft were joined by the F-102 which was modified to carry the nuclear GAR-11 missile. Phase-in of GAR-11 missiles began early in FY 1962.

Bolstering the regular interceptor force were 25 Air National Guard interceptor squadrons, part of which had nuclear capability. This first-line, Category I, augmentation force went on 24-hour alert commitment under NORAD control at mid-1961. Less than half of the ANG squadrons had supersonic aircraft (F-102's, F-104's, F-100's); the other squadrons had F-86L's and F-89J's.

NORAD had planned on a third generation interceptor, the long-range F-108, which was cancelled in 1959. Service research and development on the fire control and missile systems was continued, however. In the meantime, NORAD continued to seek, on a top priority basis, new aircraft for its forces. One type it wanted was termed an Improved Manned Interceptor (IMI), to be provided in the period FY 1966 to FY 1968. IMI squadrons would

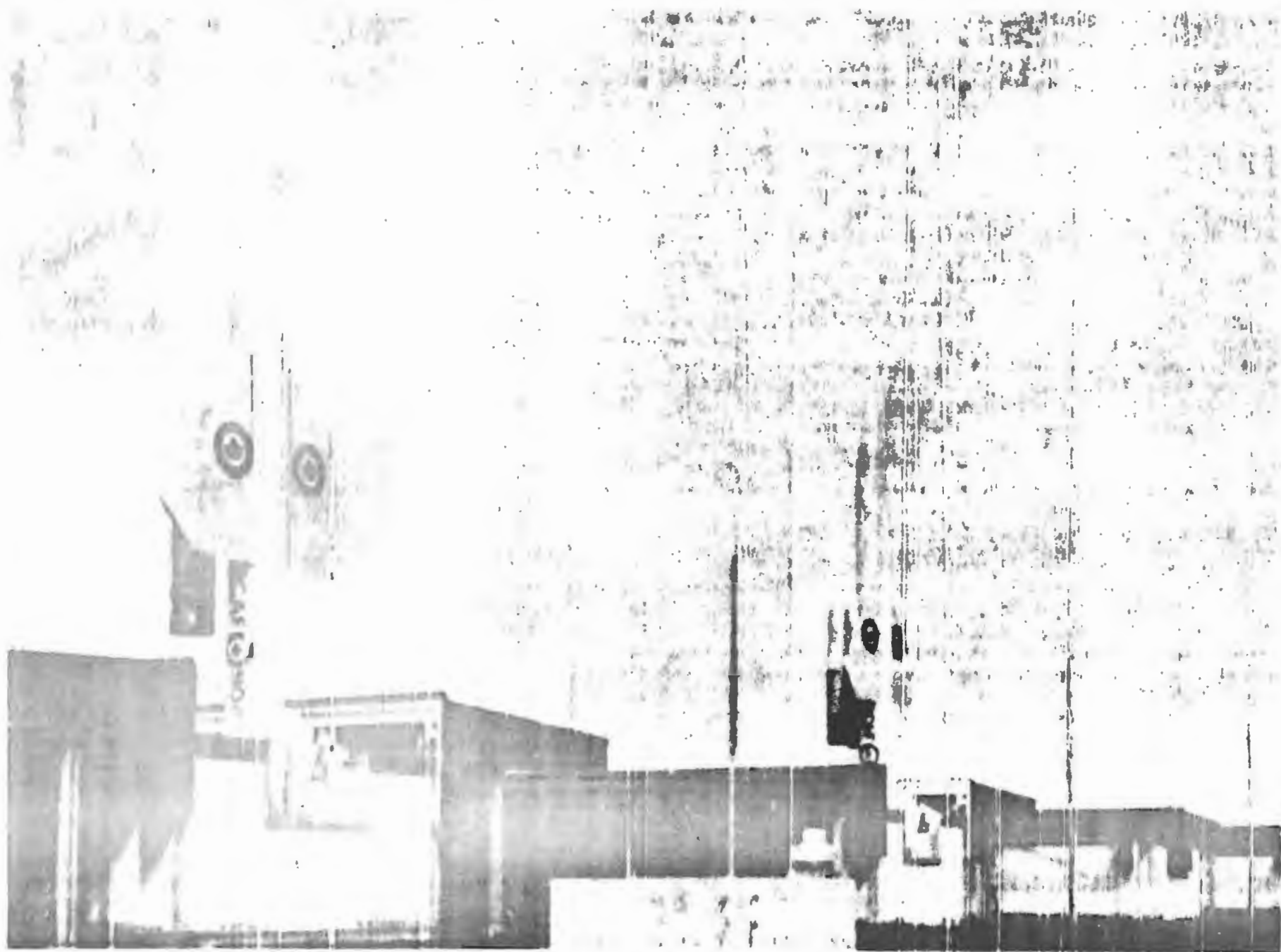
* Sixty-six F-101's were transferred from the USAF to the RCAF under the terms of a June 1961 agreement by which the RCAF assumed manning, operation, and maintenance of radar stations in Canada.



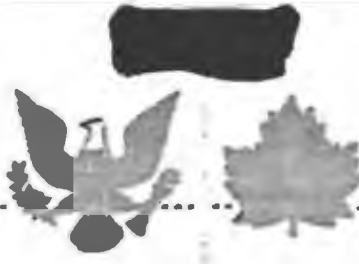
USAF F-106's



USMC F-4



RCMP BOMARC B MISSILES, NORTH BAY, ONTARIO



replace part of the current squadrons, compensating for the attrition and obsolescence of current aircraft. NORAD also wanted an Advanced Manned Interceptor (AMI) that would provide a quantum jump over current defense capability.

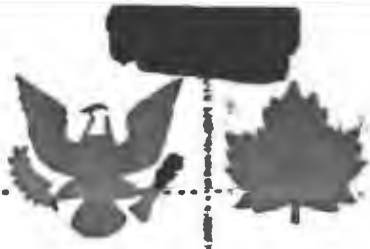
MISSILES

BOMARC. The ten-squadron BOMARC program was completed in December 1962 when the second and last Canadian squadron became operational. Part of the force consisted of the second-generation missile, the improved, longer-range "B" model, which first became operational in June 1961. Two squadrons had A missiles, five had B missiles and three had both.

Hercules. The conversion of Regular Army missile units from the high-explosive-armed Nike Ajax to the advanced nuclear-capable Nike Hercules was completed in November 1961, seven months ahead of schedule. There were 139 fire units (four in Thule, nine in Alaska, and 126 in the U.S.). The Ajax missiles were given to the National Guard. Following this, in 1962, a program was started to phase Ajax missiles out of the Guard and replace them with Hercules. RA Hercules units were to phase out as ARNG Hercules units came in so that the number of Hercules fire units remained the same. When the program was completed there would be 48 ARNG Hercules fire units and 91 RA Hercules fire units.

SURVEILLANCE

The total number of NORAD land-based long-range radar sites and gap filler sites changed only slightly in the first years of the 1960's, but dropped in 1963. By May 1963, NORAD had 178 long-range radar sites operating on the continent (184 at the end of 1959). It had 96 gap fillers operating (114 at the end of 1959), plus nine on standby.



In 1963, all of the gap fillers were in the U.S., for six on the Canadian East Coast had been taken out of the system in June 1961 as no longer required.

Nearly all of the prime site radars were new types installed in the late 1950's or in the 1960's. All but a few of the radars of the early 1950's had been phased out and those remaining were to go soon. The new radars included a few frequency diversity types and most of the other radars had received ECCM improvements. The gap filler radars were still FPS-14's or FPS-18's, however, as in 1950. An improved radar, the FPS-74, had been scheduled to begin coming in in 1963, but this program ran into delays and was very uncertain.

Although the system continued to be modernized, its size and improvement would be considerably less than once planned and programmed. Numerous cuts had reduced many radar improvements, such as ALRI equipment, new frequency diversity radars, and new gap fillers. Back in October 1950, prior to the reductions of early 1960, there were programmed 246 gap fillers for all areas and 211 prime radars of which 121 were to be new frequency diversity types. By 1963, 172 gap fillers and 203 long-range search radars, of which 56 were to be new frequency diversity types, were programmed. Further cuts were indicated, however.

In 1960, the gap filler program was set at 194 sites, of which 182 were to have FPS-74's and 12 were to have ~~FPS~~-18's. Reductions, such as for providing funds to buy a ~~SAGE~~ backup system (see below), had lowered the total program to 172 sites by early 1963 and the number of FPS-74's to 124.

Off-shore contiguous coverage continued to be provided by picket ships and AEW&C aircraft. The blimp squadron was pulled out of this off-shore force on the East Coast in 1960. One of



the Texas Towers collapsed during a storm in January 1961, another was deactivated in January 1963 and a third tower was placed on caretaker status two months later. The latter, ending use of Texas Towers, was made possible by the coming into operation of the first AEW&C ALRI station in March.

Early warning was provided by the Mid-Canada Line and the Distant Early Warning Line with few changes. In August 1961, the eastern or Greenland land-based, four-station segment came into operation and at the same time the Greenland-Iceland-United Kingdom (G-I-UK) barrier was established and the old barrier from Argentina to the Azores was discontinued.

SAGE

By the end of 1961, the semi-automatic ground environment (SAGE) system, which began to come into the defenses in 1958, had been completed at 21 sector direction centers and three region combat centers, all in the U.S. Two more region combat centers gained SAGE capability in 1962 by being tied to nearby SAGE direction centers. The combined Northern NORAD Region combat center and Ottawa Sector direction center, at North Bay, Ontario, were to become operational in 1963, completing the NORAD SAGE system.

SURVIVABILITY

BUIC and TRACE. Alternate or back-up methods of operations for use if primary SAGE centers were put out of commission had long been a part of air defense plans. But the advent of the ICBM made the need for such even greater and increased the need to provide as much survivability as possible to other elements of the system. Extensive efforts in this direction were initiated in June 1961 following studies made by USAF and DOD. These studies indicated that a fairly small missile



attack on SAGE and other vital elements of the current system could destroy NORAD's ability to carry out its mission. The Secretary of Defense approved a concept of backup control and improvement in the ability of interceptors to survive by dispersal and other means. He directed that SAGE improvement and expansion was to be stopped and the money saved and other funding used to provide a survivable backup control system. The JCS then directed NORAD to plan for a survivable defense system.

One of the results was the establishment of a program for a backup interceptor control (BUIC) system, to back up SAGE.* NORAD recommended a system of 70 computerized NORAD Control Centers (NCC's). The approved BUIC plan provided for implementation in two phases. The first phase was to be a manual operational mode. The second phase would provide equipment for semi-automatic control at 34 selected radar sites or NCC's, of which four were proposed for Canada. Phase I reached an initial operational capability by the end of CY 1962 in the CONUS. The RCAF Chief of the Air Staff approved Canadian participation in Phase I in February 1963. Phase II completion, planned for FY 1965, was experiencing some delays.

But in the meantime, NORAD developed a new concept for an even more flexible and survivable system, based on the BUIC design, which it proposed would be the primary system, replacing SAGE. This new system was called TRACE (Transportable Automated Control Environment) and it was essentially the BUIC Phase II system expanded in capacity and given transportability. NORAD presented its TRACE proposal to the Secretary of Defense in September 1962. It had not received approval by April 1963.

* Other programs included switched communications and interceptor dispersal.



COC and ALCOP. As shown previously, in November 1959, USAF deferred all action on a new hardened NORAD Combat Operations Center to be built in Cheyenne Mountain, south of Colorado Springs. This deferral lasted approximately a year. Shortly thereafter, funds were released for excavation which began on 18 May 1961. This was completed by the end of 1962. By early 1963, work on the internal building had begun. Initial operational capability in the new COC was expected to be reached by mid-1965. In the meantime, operations continued from NORAD's COC at Ent Air Force Base.

NORAD had an alternate command post (ALCOP) at Richards-Gebaur AFB, Kansas City, Missouri, the 29th NORAD Region Headquarters. NORAD designation of an ALCOP at Richards-Gebaur AFB had been continuous since November 1957. A number of units had been at that base (Central Region, 33rd Region, 29th Region), but each one in succession was designated as the NORAD ALCOP.

In October 1960, the JCS directed all unified and specified commands and the services to have by 1 July 1961, pre-located alternate command elements in hardened, dispersed, or mobile facilities as deemed best fitted to insure survivability and exercise of command under conditions prevailing at the outset of general war. In response, NORAD and ADC proposed improving the existing ALCOP. USAF rejected this, however, feeling that the Richards-Gebaur facility did not meet the requirement of survivability. USAF suggested use of the hardened North Bay, Ontario, DC CC, and NORAD and ADC agreed. The ECAF approved it in principle late in 1962. NORAD's concept was to have a manual capability by the end of CY 1963 and an automated ALCOP by the time the new NORAD COC became operational. Funding had not been provided, however.

In the meantime, as a further effort to assure continuity of command and control, in April 1962, NORAD designated the 30th NORAD Region,



Truax Field, Wisconsin, as its secondary ALCOP.

MISSILE AND SPACE DEFENSE

BALLISTIC MISSILE EARLY WARNING SYSTEM

30 September 1960 was a landmark in air defense -- the first operation of a system against the ballistic missile threat. On this date, the detection radars at the first BMEWS site, Site I, Thule, Greenland, attained an initial operational capability.* Two-site detection capability was achieved on 30 June 1961 when Site II, Clear, Alaska, reached IOC with its detection radars. A tracking radar became operational at Site I at the end of December 1961.

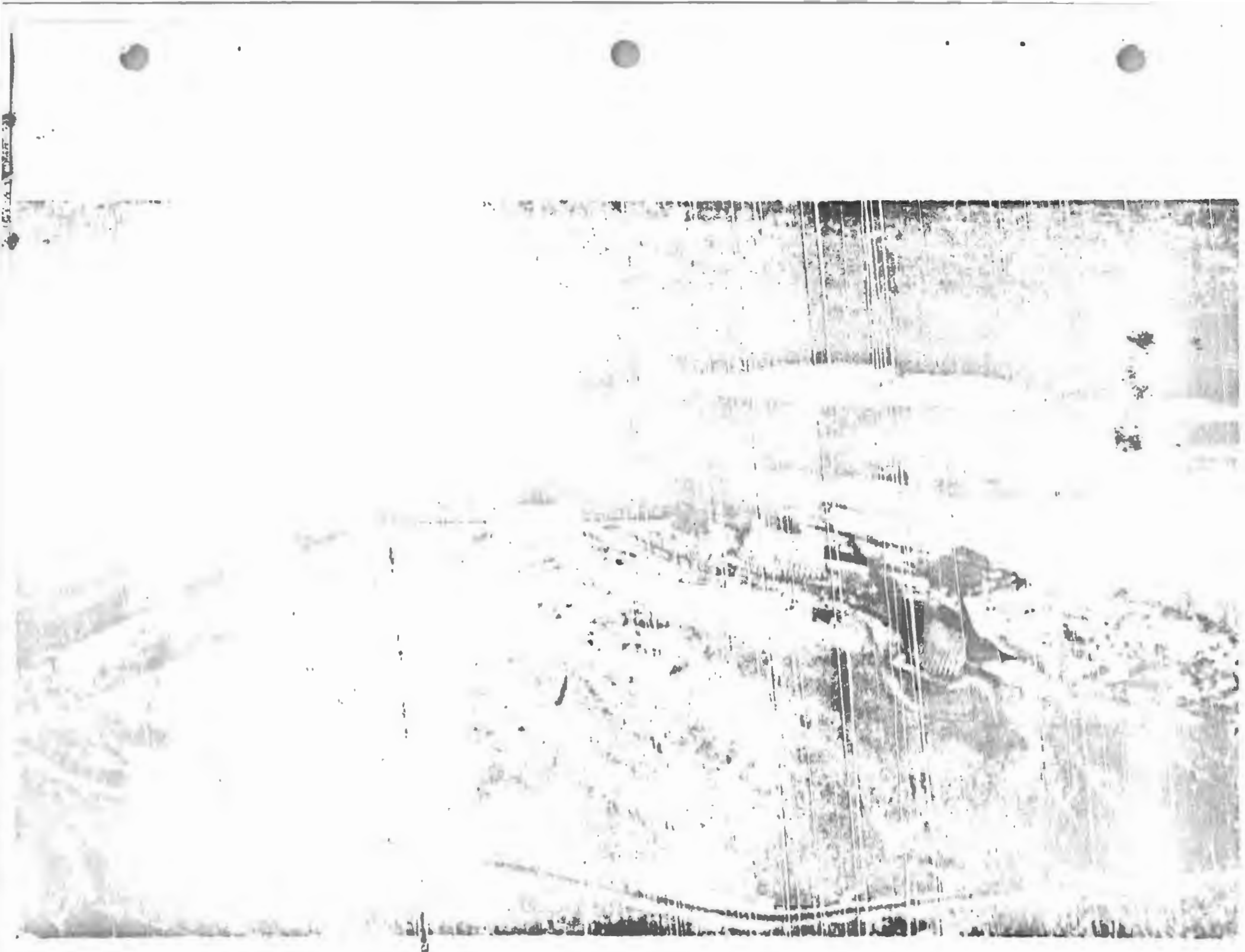
A third site, being built at Fylingdales, England, was originally scheduled to go into operation in March 1963. Labor difficulties delayed completion, however, and the date had slipped to the fall of 1963 for initial operational capability.

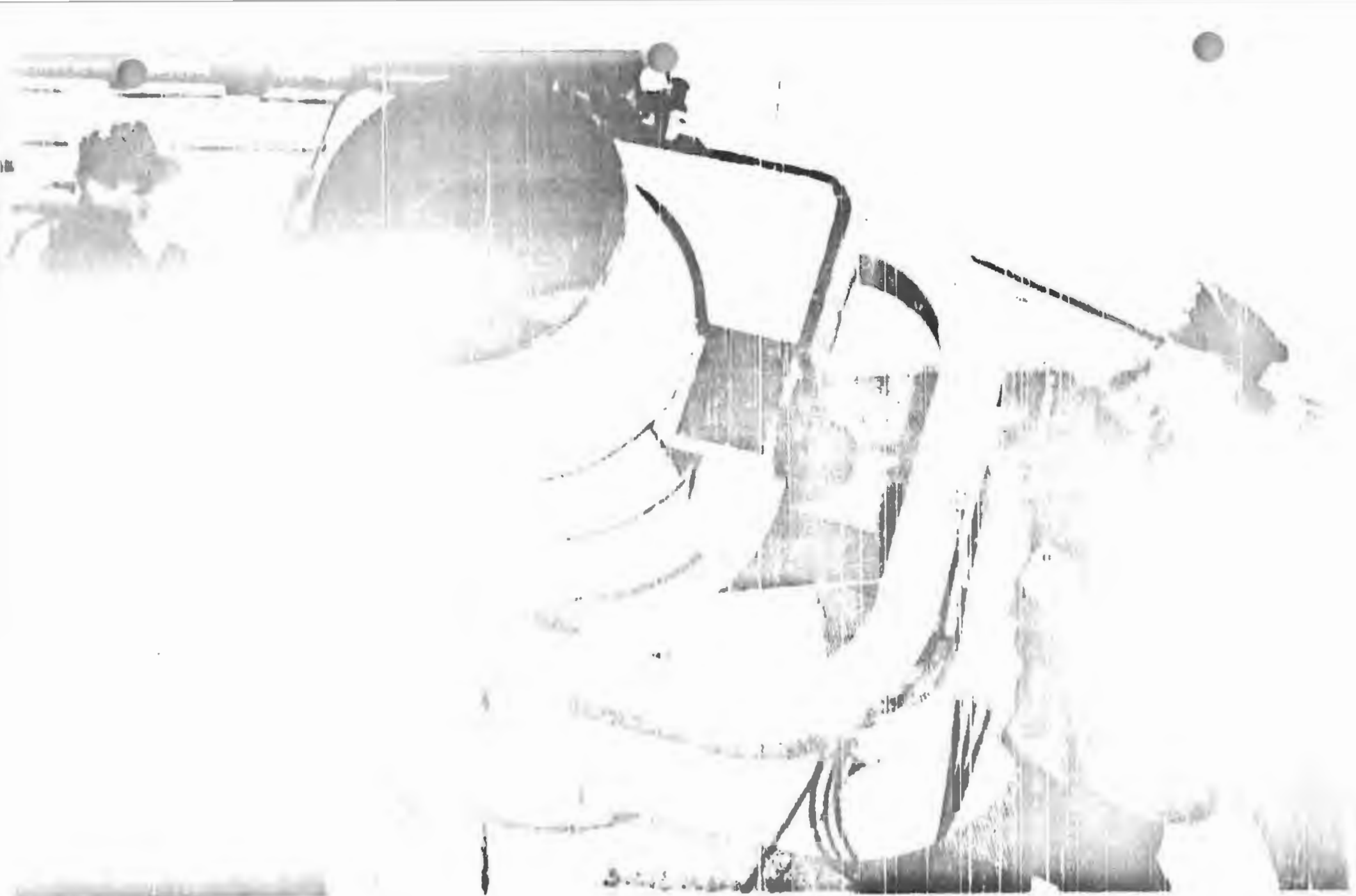
In the meantime, because of limitations in BMEWS and expansion of the ICBM threat, NORAD was seeking a number of improvements in BMEWS. Included were ECCM modifications, extension of detection ranges, gap fillers for low angle coverage, and rearward communications improvements.

SPACE DETECTION AND TRACKING SYSTEM

NORAD long sought operational control of space warning systems and regularly had urged the JCS to act in this direction. In a letter of June 1960, CONAD pointed out that "it is mandatory that all air and space be under continuous

 Fully automatic operation was achieved at Site I on 31 January 1961 and at Site II on 30 September 1961.





BAKER-FILM, IN CAMERA, PRIMROSE LAKE, ALBERTA



surveillance, reporting to a single commander who can correlate, evaluate, and establish the credence of complementary sensor and intelligence information...." The defense mission of CINCONAD and CINCHORAD, CONAD said, should be expanded to include space as well as the sensible atmosphere.

The JCS took a first step in this direction on 7 November 1960 when they assigned CINCHORAD operational control and CINCONAD operational command of the Space Detection and Tracking System (SPADATS). This system consisted of the Air Force Spacetrack and the Navy SPASUR (SPACE SURveillance) systems.

NORAD was to develop the operational procedures for the two systems and also to plan for the future development of SPADATS. In April 1961, the JCS told NORAD that SPADATS was not to be restricted to the two original systems, but that other sensors and systems could be planned for.

The JCS also directed that the SPADATS central control facility be manned and operated as an integral part of the NORAD COC. Until the Ent AFB COC achieved a computer capability, NORAD used the USAF facility at L.G. Hanscom Field, Massachusetts, for SPADATS control. This function was transferred to Ent AFB in June 1961. Later, NORAD would move SPADATS control to the new, underground COC.

In 1963, SPADATS' USN SPASUR fence consisted of three transmitters and four receivers stretching across the southern United States. Space-track had four assigned radar sites (FPS-78 at Laredo, Texas; FPS-17 and FPS-80 at Shemya, Alaska; and the two SNEWS radars at Clear and Thule), and two cooperating radar sites (FPS-49 at Moorestown, New Jersey; and FPS-17 at Diyarbakir, Turkey). Canada contributed a Baker-Nunn camera at Cold Lake, Alberta, which was under NORAD operational control, and a tracker radar at Prince Albert, Saskatchewan, which provided data on an "as required/as available" basis. And the National

[REDACTED]



Aeronautics and Space Agency, Atlantic Missile Range, and Pacific Missile Range had agreements with NORAD to provide certain data as available and/or on request.

As with EMEWS, NORAD was also working on improvements and expansion of SPADATS.

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Chapter Four

CONAD AND ITS BACKGROUND

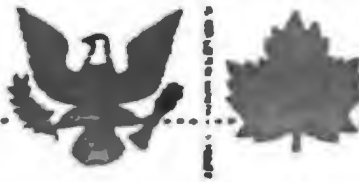
EARLY INTEGRATION

As shown in the first chapter, at the end of World War II, the Army Air Force established the Air Defense Command and gave it the mission of organizing and administering the integrated air defense system. Almost immediately, however, a dispute arose over which agency, the AAF or the Army Ground Forces, the air defense mission belonged to and what air defense meant. The AGF challenged the concept that had come out of the war that the air force commander should be responsible for air defense of an area and that antiaircraft artillery employed in air defense should come under the control of the air commander.

In May 1946, the War Department confirmed the ADC mission and added that ADC should control and train such antiaircraft units as might be assigned to it. Following this, the AAF proposed that AA forces be integrated with it. This caused the Army Ground Forces to make a counter proposal that the air defense mission be divided, with it taking over local air defense and the AAF providing air defense beyond the range of ground weapons.

AAF countered that the speed of modern aircraft and the fact that an attack would be sudden and without warning made it necessary to have a coordinated, defense-in-depth system under one commander.

In late September 1946, the War Department agreed with the AAF that the air defense mission should be unitary. It provided that while AA employed with the ground forces was of primary



concern to the Ground Forces, AA assigned to air defense would come under the control of the Air Force.

During these early years, this problem of control was largely academic, for there were few units assigned to continental air defense. However, from the start there were agreements and provisions for the use of AA forces in an emergency. Early in 1947, AAF and AGF agreed that in an emergency AA forces would follow procedures set up by ADC governing assignment of targets, opening and ceasing fire, and conditions of alert. Detailed arrangements were worked out by the numbered armies and numbered air forces.

In the meantime, ADC's commander, General Stratemeyer, was seeking authority to use the aircraft and radar of other Air Force commands and services in an emergency because he had so few forces of his own. AAF Headquarters agreed that he should work with other commands to set up an integrated air defense system, but did not back him with any authority.

This continued to be the state of air defense in the U.S. until after the Air Force became a separate service in 1947. In December 1947, the new Headquarters USAF advised ADC that in an emergency, it would be given fighter forces from SAC, TAC, and the Air National Guard.

ADC also made attempts in these early years to arrange for use of Navy fighters in an emergency. Nothing very satisfactory was achieved, however. There was no high level authority for such until after the Key West Conference of the Secretary of Defense with the Joint Chiefs of Staff in the spring of 1948.

Service responsibility for air defense was established for the first time at this conference. The Key West Agreement, which was approved by the President and issued as an official directive on



21 April 1948, gave the Air Force over-all air defense responsibility. The USAF was assigned the mission of providing continental air defense in accordance with the policies and procedures of the JCS. Air defense, thereby, became a unilateral Air Force responsibility, though the Army and Navy were assigned air defense roles as collateral functions.

Air Force officials recognized, however, that the resources of all the services would be required to defend the nation against air attack. It would be necessary to employ Army antiaircraft weapons and Navy fighter aircraft and radar equipment. The Key West Agreement provided that the Army and Navy would furnish these resources in keeping with JCS policies. But no JCS policies were issued, so ADC had to rely on inter-service agreements to get available air defense forces. In other words, employment and integration of forces was achieved through the means of bilateral agreements: Air Force-Army, Air Force-Navy, ADC-Air Force command, ADC-Navy command, etc.

Of importance was the creation on 1 July 1950 of the Army Antiaircraft Command and the agreement completed a month later between the Army and the Air Force setting up arrangements for employment of AA in air defense. This agreement provided that the Air Force air defense commander could establish the states of alert and the basic rules of engagement. And it stipulated that operational control, insofar as engagement and disengagement was concerned, was to be exercised directly by the air defense commander. These actions assured AA forces for air defense and began the integration of AA and air forces.

UNIFIED COMMAND CONSIDERED

In the meantime, the establishment of a unified organization for air defense in the U.S. was being considered in Washington. In late 1946,



the War Department drew up a plan for a joint command. There was considerable difference of opinion, however, and the plan was shelved. In 1948, the Air Force considered establishment of the Air Defense Command as a specified command of the JCS. But there was much opposition from within the Air Force and from ADC to this.

The next serious consideration of reorganization came in 1950 when USAF prepared a plan for a unified air defense command. By this time, the original ADC had been abolished and the mission taken over by the Continental Air Command (ConAC). The latter opposed the USAF plan and proposed a specified command. USAF sent the unified command plan to the JCS anyway, but no action was taken. ConAC then recommended that a separate air defense command be established because of the growth of air defense. USAF agreed and on 1 January 1951, re-established ADC.

The question of command arrangements for air defense in the U.S. did not come up again until 1953.

CONAD ESTABLISHED

In August 1953, the JCS asked the Air Force Chief of Staff, General Nathan Twining, to prepare plans for establishment of a JCS command for air defense. General Twining instructed the Air Staff to consider the air defense organization. The Air Staff, by this time, favored maintenance of the status-quo. It recommended adoption of a plan by which the Air Force Chief of Staff would report to the JCS on air defense matters or a plan for a specified command.

However, both Admiral Arthur W. Radford, Chairman of the JCS, and General Twining believed that air defense had become far too large and too important for the Air Force to handle alone. Early in 1954, Admiral Radford sent a memorandum



to the JCS reminding them that it was required by law that they establish unified commands in strategic areas when such was in the interest of national security. He felt that a JCS command for U.S. air defense was now required. The JCS then approved the idea, in principle, and directed the Joint Strategic Plans Committee to prepare terms of reference. The committee reported on 1 March 1954, with a difference of opinion as to the degree of responsibility to be given the commander of the new organization and a recommendation that the views of the Army, Navy, and Air Defense Command be obtained.

General Benjamin W. Chidlaw answered for ADC in May 1954 with a proposal for a joint command under the JCS with the Air Force as executive agency. "The operating command for air defense must be organized on a geographical basis," he explained, "with sub-commands, all having the same mission -- that of air defense of a geographical area." He proposed that joint headquarters be established at each echelon of the existing ADC structure through air division. The staffs would consist of the staffs of the current ADC headquarters, plus a small number of Army and Navy personnel, and would be commanded by the ADC commanders. He proposed that there be three components under the joint command -- Army Antiaircraft Command, Air Defense Command, and a Navy Command yet to be formed. Responsibility for air defense would be given to the joint command, which would have operational control of the forces of the component commands and any augmentation forces. This operational control would be exercised through the joint command's own echelons.

The Navy agreed with ADC. But the Army felt that joint headquarters below command level were unnecessary and that operational control should be exercised through the component commands.

The difference of opinion was eventually resolved, however, and the JCS directed establishment of the Continental Air Defense Command (CONAD).



CCNAD was established on 1 September 1954 at Ent AFB, Colorado Springs, Colorado.

As set up, CONAD was almost identical to the organization recommended by General Chidlaw. CONAD was given the mission "to defend the continental United States against air attack." The Air Force was made executive agency and it was stipulated that CINCONAD would be an Air Force officer. General Chidlaw was named CINCONAD in addition to his duties as ADC Commander. Three components were designated: ADC, ARAACOM and Naval Forces Continental Air Defense Command (NAVFORCONAD), the Navy command established at this time.

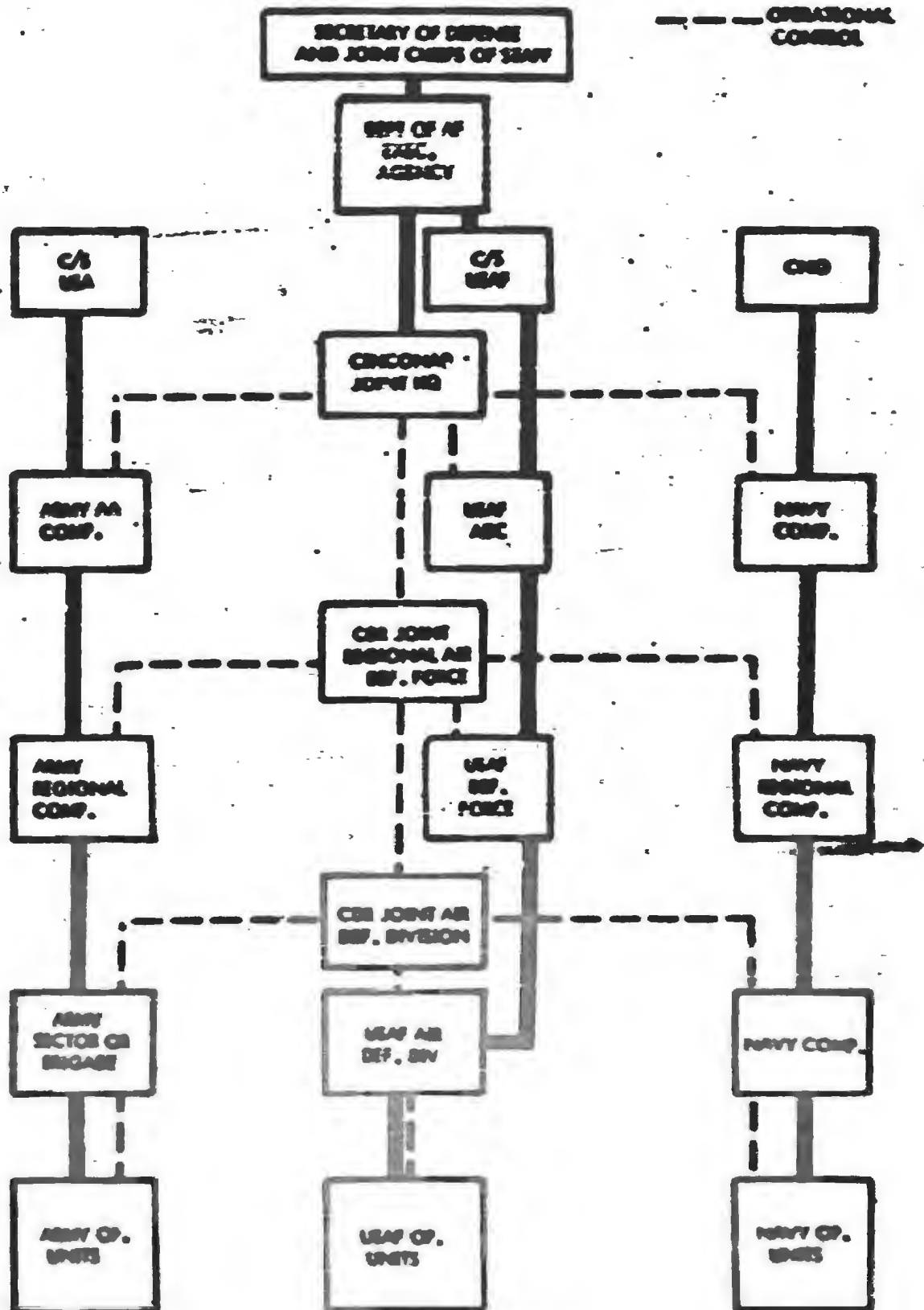
The terms of reference gave CINCONAD operational control of all forces assigned or otherwise made available by the JCS or other authority. This included augmentation forces, in an emergency. Operational control, the terms said, consisted of directing the tactical air battle, controlling fighters, specifying conditions of alert, stationing early warning elements, and deploying the command combat units.

CONAD was superimposed upon the existing ADC structure. Each ADC Headquarters from command down through air division level was additionally designated a joint headquarters, either a joint defense force or a joint division (e.g., Joint Western Air Defense Force, 32d Joint Air Defense Division). The commanders and staffs of the defense forces and air divisions of ADC all assumed dual roles.

INEFFECTIVENESS OF CONAD

The CONAD established on 1 September 1954 proved to be very ineffective and two years later was overhauled. It was important, however, as a start toward unity in planning and direction. A long process of trial and error and evolution in thinking on the part of all concerned would be required before clear unity was realized.

**OPERATIONAL
CONTROL**



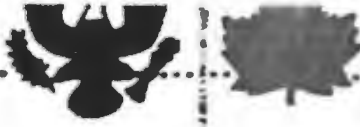


One large fault in the first organizational arrangement was the fact that CONAD had no separate entity, i.e., CONAD was nothing more than an additional designation for the USAF Air Defense Command. The commander, vice commander, and all deputies and directors were the same people for CONAD and ADC throughout the organization from command headquarters through joint defense forces and divisions.

What was expected was that ADC could function simultaneously as a joint headquarters and a component headquarters. This did not work. There was confusion. The staff officer had difficulty in determining whether a function belonged to ADC or CONAD, whether an ADC or CONAD channel should be used, or whether one should act as an ADC officer or a CONAD officer. This situation was true from command headquarters on down except that recognition of CONAD decreased the further down the echelon.

At any rate, there is not much to record in the way of accomplishment during CONAD's first two years other than the fact that a beginning was made. The ADC staff made a start toward putting operational policy and procedure matters in CONAD's name. After a year of existence, CONAD had a total of ten regulations, four of which were on publications matters. The remaining six covered states of preparedness, reporting of jamming, and funding for the headquarters. On the other hand, eighteen ADC regulations were made applicable to CONAD. Ten more CONAD regulations had been added by the time it was separated from ADC in September 1956. They covered the above subjects plus other operational matters in CONAD's sphere, such as rules of engagement and states of alert. Thirteen ADC regulations were still being used.

The CONAD letterhead was used quite extensively by the ADC staff in correspondence with Air Force commands on augmentation and with the Army and Navy and the component commands, as might be



expected. The primary areas of CONAD activity were rules of engagement, readiness and alert states, operational procedures, and inter-service and inter-command agreements.

PROBLEM OF WEAPONS INTEGRATION

A major problem and a major consideration in the reorganization of CONAD was a conflict in views over integration of weapons systems and centralized control. The problem centered around employment of antiaircraft weapons in the SAGE era.

Early in 1955, Lincoln Laboratory studied the matter of employing antiaircraft weapons in the SAGE period at the request of the Army. Lincoln recommended that assignment of targets to antiaircraft batteries be accomplished by Army personnel located at the SAGE Direction Center. This idea was unacceptable to the Army Antiaircraft Command which wanted a decentralized control system under which batteries could take any target under assignment within acquisition range of the battery. The Army was developing a weapon control system, the AN/FSC-1 (Missile Master), for control of the Nike missile. But this was to be used primarily as an aid in fire distribution among AA batteries, according to the Army concept. ADC, meanwhile, held the same concept as Lincoln Laboratory, i.e., centralized control. ADC wanted Nike to be controlled by the SAGE direction center.

Because the Army Antiaircraft Command and the Air Defense Command held conflicting views, a CONAD decision was required. Obviously, since ADC and CONAD were one and the same, CONAD's views were the same as ADC's. During the next several months, however, nothing concrete was accomplished. Numerous briefings and conferences were held and several proposed operations plans drawn up. But the CONAD/ADC-ARAACOM views remained far apart.

In the meantime, another action was underway which was to lead to a broadening of CONAD's



mission. This was revision of the Unified Command Plan by the Joint Chiefs of Staff. Their aim was to produce a more efficient military structure world-wide and to cut costs. Early in 1956, when each service was making recommendations for this revision, USAF proposed abolition of the Alaskan and Northeast Commands and assignment of air defense of these areas to CINCONAD.

The ultimate revision to the Unified Command Plan gave Alaskan air defense to CONAD, but retained Alaskan Command, and gave air defense of the Northeast Area to CONAD and abolished the Northeast Command.

While these changes were being deliberated, on 3 May 1956, the Armed Forces Policy Council heard a briefing on the problem of CONAD centralized control versus Army decentralized control from CINCONAD, General Earle E. Partridge, and the Army and Air Force. General Partridge told the Council that the air defense battle was a single battle and therefore it was necessary to fight an integrated battle from the point of engagement until the enemy was destroyed. He said that he believed the air defense system for CONAD had to be based on the integration of firepower of all air defense weapons, a system which employed a single operational control channel down to the lowest level where sufficient intelligence was available to permit coordinated effort, and a system which eliminated unnecessary duplication.

Following the presentations, it was decided that the JCS should prepare recommendations on command relationships and operational control for air defense and to clarify the authority of CINCONAD. The JCS, it turned out, felt that many of the difficulties CONAD was experiencing were caused by the organizational arrangements and to the wording of the existing terms of reference, especially in regard to operational control. Among their recommendations was separation of the headquarters of ADC and CONAD.



Earlier, in April, COMAD had sent in a recommendation for separation of ADC and COMAD headquarters. COMAD proposed a separate staff of around 350 (120 officers). Both the Army and Navy component commands had objected to the proposed size of the COMAD staff. The Navy commander suggested that about 30 to 40 officers were all that would be needed. Both asked for increased representation for their services, objecting to the fact that nearly all key positions were proposed for Air Force officers.

At any rate, on 19 June 1956, the Secretary of Defense approved the JCS recommendations which included new organizational arrangements and a strengthening of the operational control provision for COMAD. The joint staff was directed to revise the terms. The Secretary of Defense also approved the JCS Revised Unified Command Plan.



Chapter Five

REORGANIZATION OF CONAD

NEW TERMS OF REFERENCE

As shown, the CONAD organization that took so many years to be established had to be overhauled after two years of existence. But a much-strengthened CONAD organization emerged. New terms of reference were sent to CONAD on 4 September and were effective upon receipt. They provided for the change in mission directed by the Revised Unified Command Plan and for a change in organization.

CINCONAD's mission was broadened in two areas: (1) responsibility for air defense of Alaska and the Northeast Area and (2) responsibility for assisting in air defense of Canada and Mexico according to approved plans and agreements.

Two changes were made to help strengthen and clarify CINCONAD's authority and responsibility. One was a new definition of operational control. The 1954 terms had defined CONAD's operational control as consisting of the authority to direct the tactical air battle including engagement and disengagement of weapons, control of fighters, specify the conditions of alert, station the early warning elements, and locate and deploy the combat elements of the command in accordance with JCS-approved plans.

Operational control was now broadened and strengthened. The new terms defined CINCONAD's authority as those functions of command involving composition of subordinate forces, assignment of tasks, designation of objectives, and direction necessary to accomplish the mission. CINCONAD's authority included the right to determine procedures



for conducting the air battle, for exercising operational control of all assigned forces, and for directing engagement and disengagement of weapons. Finally, a point inserted because of the integration of weapons problem, operational control included authority to centralize operational control of forces, including the assignment of individual antiaircraft batteries to designated targets.

The second change made to strengthen CONAD was separation of ADC and CONAD Headquarters. CINCONAD was authorized to set up a separate headquarters with a separate staff. Furthermore, the terms said he could establish such subordinate joint organizations as he deemed necessary to accomplish his mission, including those necessary to permit centralized control and employment of all air defense weapons available. And the terms specifically stated that CINCONAD's joint commanders were responsible for combat operations.

CONAD Headquarters lost little time in separating itself from ADC Headquarters. On 17 September, a CONAD staff structure was established and by 1 October 1956, CONAD was physically separated and functioning separately. The CONAD Commander-in-Chief, General Partridge, was relieved of command of ADC on 17 September and Lieutenant General Joseph Atkinson was named ADC commander.

CONAD's proposed manning of 350 for its headquarters was approved. This included 124 officers (85 Air Force, 25 Army, 13 Navy, and 1 Marine Corps). The January 1957 strength report shows 353 assigned. ARIACOM and NAVFORCONAD, as shown above, had opposed a large CONAD staff. Both had also objected to the near absence of Army and Navy officers in key staff positions. Air Force dominance was defended by General Partridge:

In determining the composition of the headquarters staff under the terms



of reference, due consideration was given to each of the military services and their basic functions. Since air defense planning and operation for the North American continent requires, during this time period, an intimate knowledge of offensive and defensive aerial warfare, I selected initially Air Force personnel for certain key staff positions. It is my intention to utilize the personnel made available by the three services to the limit of their capabilities with due consideration to rank, experience and forces assigned.

REGIONS AND DIVISIONS

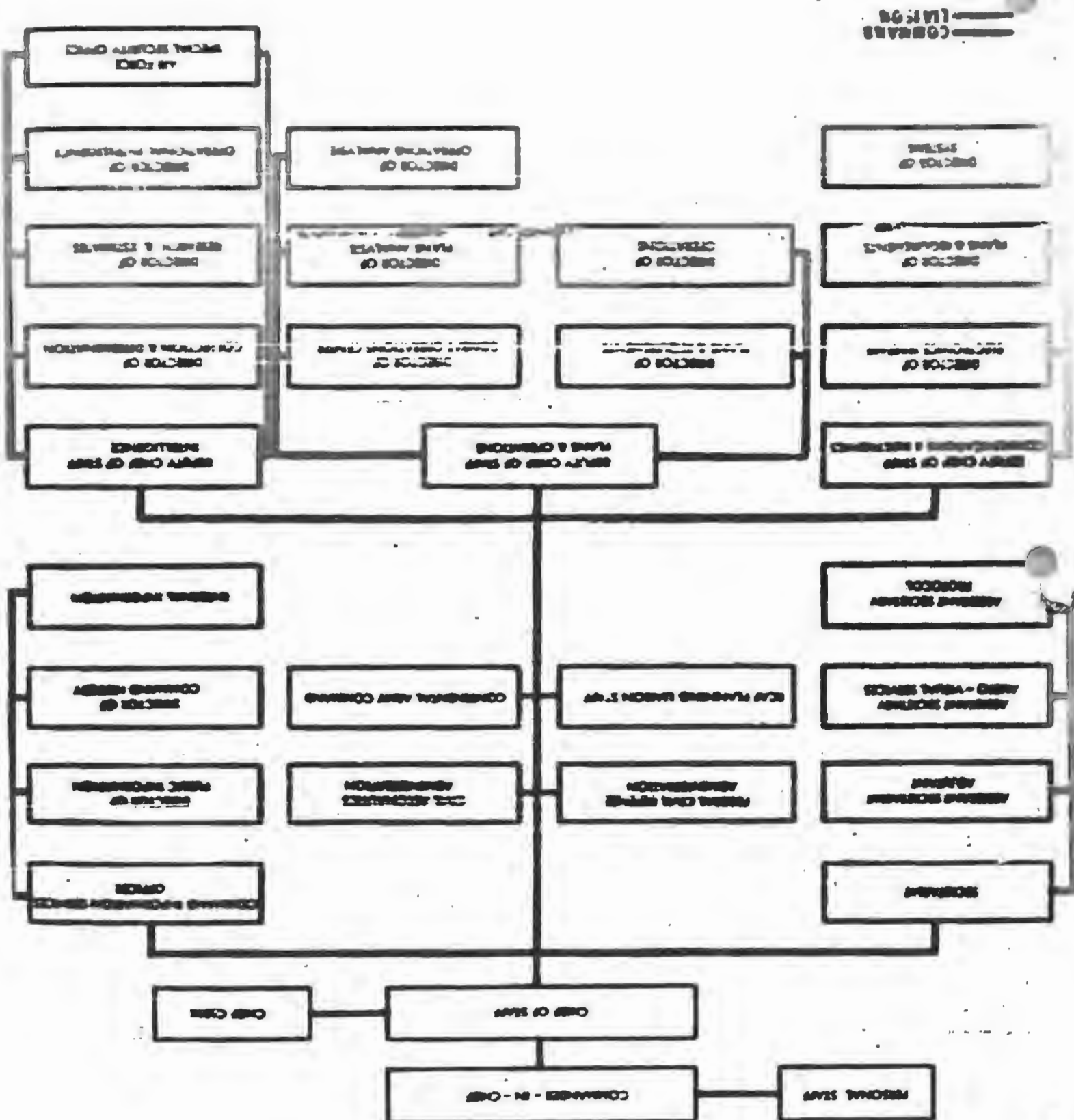
CONAD's next effort was toward establishing subordinate organizations as separate as possible and with as much identity as possible. Effective 15 January 1957, CONAD disestablished all of its joint defense forces and joint divisions set up in 1954 and replaced them with CONAD regions and CONAD divisions. A total of three regions and sixteen divisions were created at this time. The CONAD regions and divisions were made responsible for the same geographical areas as the organizations they replaced, their headquarters were at the same place and they carried the same numerical designation.

The term "region" was adopted because it was the traditional term for the subdivision of an air defense territory and also it gave the major CONAD subordinate unit a little more separate identity. In other words, it set them apart from the ADC defense forces.

Then CONAD stated in a regulation that each region and division was to be organized as an operating agency, separate from the headquarters of each component command. The regulation directed that the commander of each unit was to have a

ORGANIZATIONAL CHART

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separate joint staff, limited to the number necessary to perform the command's mission. CONAD division commanders were to exercise operational control over all air defense systems and CONAD forces and units in air defense within their assigned areas.

But while CONAD directed that separate staffs be formed, it had absolutely no manning authorization to provide its subordinate organizations. All that CONAD could do was direct ADC to give its defense force and division commanders the additional job of commanding the CONAD regions and divisions.

However, following receipt of CONAD's regulation, the Western CONAD Region drew up a staff organization and manning and appointed personnel. But when no manning authorizations were forthcoming, Western revoked its assignments and filled the positions with Western Air Defense Force personnel on a dual-role basis and with such Army and Navy personnel as were made available. Central Region established a staff but with defense force personnel as an additional duty. Central Region also had one Army and Navy representative. Eastern Region went further than the others. It formed a physically-separate headquarters, manned by defense force personnel and a few Army and Navy representatives. This staff actually functioned separately with region duties as its primary responsibility.

The CONAD division commanders also had to appoint ADC division personnel to CONAD positions as an additional duty.

CONAD FUNCTION OF AUTHORITY

In the meantime, CONAD Headquarters was beginning to function as a separate, independent organization. It began slowly tightening its grip on the management of air defense, moving into



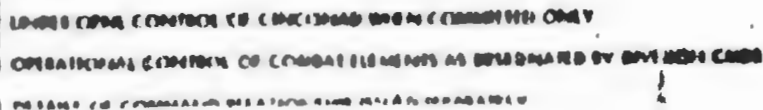
CONAD HEADQUARTERS BUILDING - 1956

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RCAF ADC HEADQUARTERS BUILDING - 1957

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one area after another to establish policy and guidance. As noted, at the end of CONAD's first two years, it had 20 regulations in effect. Another 20 were added in the first year after CONAD separated from ADC. These directives not only expanded guidance on areas previously covered, such as on augmentation forces, but provided guidance on new areas, such as on exercises and tests. Also as noted, as of 1 August 1956, just prior to the ADC/CONAD separation, there were still 13 ADC regulations and two manuals being used by CONAD. On 1 April 1957, CONAD announced that no ADC regulation or manual was applicable to Headquarters CONAD or CONAD field units. The cord was cut.

A significant manifestation of CONAD's authority was its ability to bring about collocation and integration of ADC and Army Antiaircraft control facilities. As shown previously, ARAACOM was getting the AN/FSG-1, Missile Master, and ADC had the AN/GPA-37 control system and would soon start getting the SAGE system. The problem of employing antiaircraft weapons in the SAGE period had plagued the first CONAD and had been one of the big considerations in the reorganization of CONAD.

A plan for antiaircraft weapons employment in SAGE, prepared by CONAD, ADC and ARAACOM prior to the CONAD reorganization, was acceptable in concept by the Office of the Secretary of Defense, but needed further expansion and testing. One big matter was testing SAGE-Missile Master integration.

In a review of the whole subject, CONAD saw that because the Missile Master would be coming in ahead of SAGE, the most immediate problem was to find a method of integrating the AN/FSG-1 into the manual air defense system. CONAD concluded that the operation of the ADC interceptor control system, the AN/GPA-37, could be integrated with the Missile Master at the same location. A plan



for such collocation at ten sites (the number of Missile Masters on order) was then developed by CONAD and submitted to the JCS.

Both the Army and Air Force accepted the CONAD plan and on 30 October 1956, the Office of the Secretary of Defense concurred in this collocation. CONAD could now proceed to carry out integration. The first guidance was a letter in December 1956, directing collocation of the direction centers and Missile Masters at facilities to be designated joint control centers. It was to be 1961, however, before these collocated control centers were fully operational. Collocation and integration was later expanded to include non-Missile Master Army command posts with associated Air Force direction centers, as feasible and desirable. These became operational mostly in 1960, with one, the first collocated center, at Geiger AFB, Washington, becoming operational in May 1958.

CONTROL OF ALASKAN AND NORTHEAST AIR DEFENSE

While this activity was underway, CONAD was also busy assuming responsibility for air defense of the Northeast Area and Alaska as assigned in the 1956 terms. The U.S. Northeast Command, a JCS unified command, was disestablished by the JCS on 1 September 1956 in accordance with the Revised Unified Command Plan. On this same date, CINCONAD took over responsibility for air defense of the Northeast. CINCONAD designated the Commander, Northeast Air Command, his subordinate joint commander responsible for air defense in this area. CINCONAD told him that he would have the same responsibilities as formerly held by the Northeast Command and that there would be no change in the arrangements with Canada and Denmark for air defense operations.

The RCAF Air Defence Command had operational control of U.S. air defense forces in the Canadian



portion of the NEAC area. CINCONAD and the AOC RCAF ADC signed a new agreement, dated 1 January 1957, to redefine this control and bring it up to date. The AOC's responsibility was to be exercised through CINCONAD's subordinate commander in the area.

The latter was changed to Commander, 64th CONAD Division, on 1 April 1957. At that time, NEAC was abolished by the Air Force in keeping with the reorganization of the area. With this abolition of NEAC, USAF ADC took over command of the USAF air defense forces in the area. Earlier, on 1 September 1956, the antiaircraft group in the area, the 7th at Thule, was transferred from First Army to the Army Air Defense Command.

Meanwhile, on 1 September 1956, CONAD also assumed operational control of all air defense forces in Alaska. CINCONAD designated Commander-in-Chief Alaska (CINCAL) as the commander responsible to him for all air defense activities in the area. He delegated to CINCAL the authority to exercise operational control of Alaskan air defense forces. CINCAL's control was to continue to be exercised through Commander, Alaskan Air Command (the Air Force component command). These arrangements were incorporated in an agreement between CINCAL and CINCONAD, dated 28 August 1956. The antiaircraft forces in Alaska remained assigned to U.S. Army Alaska.



Chapter Six

EXPANSION OF INTEGRATION UNDER NORAD / CONAD

CANADA/U.S. COORDINATION

By 1956, responsibility for air defense of Alaska and the Northeast Area was combined with that of the United States under CONAD. The next logical step was to bring in the air defense forces of Canada.

Close air defense coordination had long been maintained by Canada and the United States. In 1949, the Canada-U.S. Military Cooperation Committee (established at the end of World War II) prepared a plan for emergency defense that outlined the major joint actions necessary and principles of common defense operations. Among other things, the plan, which was approved by the U.S. JCS and Canadian Chiefs of Staff Committee, called for the preparation of detailed emergency air defense plans by the air defense commands of the two countries. The first of these was prepared in 1950. New ones were issued each year.

One of the later MCC plans authorized exploratory planning beyond the limits of the MCC plan (which said that planning could be undertaken in support of the plan). As a result, a combined air defense planning group was formed and met for the first time in May 1954 with the aim of arriving at the best North American air defense. The commanders of the two ADC's agreed a short time later to establish this planning group with a permanent staff. It was later moved to Colorado Springs.

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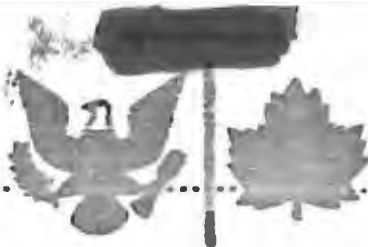
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planning committee, the appearance of the jet bombers, coupled with Soviet thermonuclear capability, made it apparent that "consideration of the defense of Canada and the United States separately was unrealistic."

Early in the fall of 1954, the two ADC commanders directed the combined planning group to prepare a plan for the best single air defense of the two countries. The plan that resulted proposed an integrated air defense of Canada and the U.S., with forces of both countries operating under a single commander responsible to both governments.

In preparing the plan, this group answered for itself the question of what was wrong with the coordinated system of defense that there had been up to that time:

The answer is that forces deployed to defend against attack from one direction (for instance from the north) are not now under one commander, which imposes serious practical limitations in day-to-day training and in our capability to conduct a properly coordinated air battle in case of actual attack.

The completed plan was presented to Canadian and U.S. military authorities. No direct action resulted, however.

NORAD ESTABLISHED

In December 1955, the U.S. Air Force Chief of Staff proposed to the other members of the JCS that they approve in principle a statement of the desirability of establishing a combined Canadian-U.S. air defense command. This proposal was eventually to lead to the establishment of the North American Air Defense Command. The JCS approved, in principle, the need for peacetime integration



of the two air defense forces, and they asked the Canadian Chiefs for their views.

The latter replied that it would be desirable to study methods of integrating the operational control of the air defense forces. They suggested that an ad hoc group of representatives of both countries be formed to make a study.

The U.S. agreed and the job was given to the Canada-U.S. Military Study Group (MSG). The latter was to create an ad hoc group to actually make the study. Near the end of 1956, the group set up by the MSG made its recommendations. The MSG approved the recommendations and in its so-called Eighth Report recommended that the JCS and CDS get approval of their governments for integration.

Among the conclusions of the Ad Hoc Group Report were the following:

- (1) Air defense of the two countries is a single problem and should be carried out on a combined basis.
- (2) Integration should be of operational control only.
- (3) There should be centralized authority for exercising operational control.
- (4) The system set up should be adaptable to general war.
- (5) The system must be in being and continuously developed and exercised so that no transitional period will be required to go from peacetime to general war.
- (6) The exercise of operational control should be through joint subordinate commanders.
- (7) The commander and his deputy should not be from the same country.



The JCS approved the MSG Eighth Report in February 1957 with the understanding that integration of operational control would be limited to the continental elements of air defense of both countries. This included the continental portions of the warning systems and the contiguous radar coverage. This was followed by approval of the Secretary of Defense. The COSC advised in May that they had completed action on the report and that the matter awaited governmental approval.

On 1 August 1957, an announcement was made jointly by the Canadian Minister of National Defence and the U.S. Secretary of Defense that the two governments had agreed to the setting up of integrated operational control of the air defense forces of the two countries under an integrated command.

CINCONAD then recommended that this command be set up immediately. General Partridge proposed that the Canadian Chiefs issue an order stating that effective 12 September 1957, operational control of the Canadian ADC would be assumed by the integrated headquarters at Colorado Springs. General Partridge pointed out that very soon there could be a Canada-U.S. command in name as well as in fact, for the Canadian officer who was to become Deputy Commander-in-Chief, Air Marshal C. Roy Slemmon, was to arrive shortly and there were already several Canadian officers at CONAD Headquarters. General Partridge also recommended the name North American Air Defense Command, abbreviated NORAD.

The Canadian Chiefs agreed to these recommendations on 3 September; the JCS on 6 September. CONAD then started action to form the new command. CONAD advised its component commands, the Canadian ADC, USAF and RCAF Headquarters, and CONAD subordinate commands that:

...operational control over the Canadian Air Defence Command and the air defense

forces assigned, attached or otherwise made available to that command will be assumed by the Commander-in-Chief, North American Air Defense Command with headquarters at Ent AFB, Colorado, U.S.A., effective 0001 Zulu 12 September 1957.

On the same date, all interested commands were advised by CONAD that NORAD was to be established at Ent AFB effective 0001 Zulu 12 September 1957. CINCNORAD would exercise operational control over Canadian and U.S. air defense forces in Canada through the Commander ECAF ADC and over all other U.S. air defense forces in the United States, Alaska, and Greenland, in accordance with the CONAD Terms of Reference.

The Department of the Air Force assigned General Partridge as CINCNORAD with no change in duty as CINCONAD effective 12 September 1957.

Thus, as of 12 September 1957, NORAD was established; all North American air defense forces were now integrated. It was not until eight months later, 12 May 1958, that the U.S. and Canada concluded a formal agreement for NORAD through an exchange of notes. The Canadian note proposed certain principles for the organization and operation of NORAD, such in line with the concepts of the MSG Ad Hoc Committee Report mentioned above. Included were the following:

- (1) CINCNORAD would be responsible to the JCS and COSC and would operate within an air defense concept approved by the two governments;
- (2) operational control was the power to direct, coordinate, and control the operational activities of forces available;
- (3) the appointment of CINCNORAD and his Deputy, who were not to be from the same country, was to be approved by both governments;



(4) NATO was to be kept informed of arrangements for North American air defense through the Canada-U.S. Regional Planning Group; and

(5) NORAD was to be maintained for a period of ten years or such shorter period as agreed by both countries.

The U.S. note agreed to the principles in the Canadian note and stated that the U.S. reply constituted an agreement between the two governments effective 12 May 1958.

Following this exchange of notes, the military chiefs of both countries approved terms of reference for NORAD, which became effective 10 June 1958

TERMS OF REFERENCE

The terms gave NORAD the mission of defending the continental U.S., Canada, and Alaska against air attack. NORAD was established as an integrated command and was to include as component commands the NCAF Air Defence Command, the U.S. Army Air Defense Command, U.S. Naval Forces CONAD, and the USAF Air Defense Command. CINCNORAD was to be responsible to the U.S. JCS and the Canadian CISC and was to operate within an agreed Canadian-U.S. concept of air defense and in accordance with agreed joint intelligence.

CINCNORAD was given operational control over the component commands and their assigned forces, the air defense forces in Alaska, and all other air defense forces made available by proper authority. Operational control was defined as the power of directing, coordinating, and controlling the operational activities of available forces (which was in accordance with the terms for operational control in the Canadian note agreed to by the U.S.).

CONAD remained in existence to serve as a U.S. national command. It was needed, the JCS advised



CINCONAD, to handle U.S. responsibilities outside of NORAD's jurisdiction, such as certain atomic matters. The JCS put into effect new terms of reference for CONAD on the same date as those for NORAD, 10 June 1958.

CINCONAD was made responsible for air defense of U.S. installations in Greenland, assisting in the air defense of Mexico in accordance with approved plans and agreements, for handling purely national matters pertaining to air defense, and for supporting other commands in their missions.

NORAD established subordinate units throughout its area of responsibility. In Alaska, in the Northeast Area, and in the U.S., NORAD regions and divisions were established at the same locations and with the same boundaries and staffs as the CONAD units. A region in Canada was established, Northern NORAD Region, with the same territory and staff as RCAF ADC. In all, NORAD established five regions and 23 divisions.

DOD REORGANIZATION ACT

Shortly after the new terms were provided, a new strengthening of CONAD/NORAD authority was provided by legislation that reorganized the U.S. Department of Defense. This act, which became law on 6 August 1958, had been requested by the President the preceding April.

The President told Congress that what he wanted to achieve and what was absolutely essential was that there be complete unity in strategic planning and basic operational direction. It was mandatory, he declared, that the initiative for this planning and direction not be with the separate services, but that it be with the Secretary of Defense and his operational advisors, the Joint Chiefs of Staff. This unified effort should apply, he said, not only to long range planning, but also to command over military operations. Among other things, the President asked





that command channels be cleared so that orders could go directly from the Commander-in-Chief and the Secretary of Defense to the commander of the unified commands.

The current set-up was cumbersome and ineffective, he said. Accordingly, he had directed the Secretary of Defense to discontinue use of military departments as executive agencies for unified commands. Lastly, he asked that the fighting forces be organized into operational commands that were truly unified.

The Department of Defense Reorganization Act clarified and strengthened Secretary of Defense authority by the provision that each military department would be organized (rather than administered as had been previously provided) under its own secretary and would function under the direction, authority and control of the Secretary of Defense. The military chiefs of the services were to exercise supervision (rather than command) over such members and organizations of the services as the civilian secretary determined. And this supervision was to be exercised in a manner consistent with the "full operational command" vested in unified and specified commanders.

Finally, the act provided that unified and specified combatant commands would be established by the President with the assistance of the JCS through the Secretary of Defense. Such commands were to be responsible to the President and Secretary of Defense for the strategic missions assigned to them by the Secretary of Defense with the approval of the President. The President would also determine the force structure of these commands. The forces were to be assigned by the service departments. These forces were then to be under the full operational command of the unified or specified commander. No forces could be removed except as authorized by the Secretary of Defense with the approval of the President.



A new Department of Defense Functions Directive was issued on 31 December 1958 putting into effect the provisions of the reorganization act. A new unified command plan was issued by the JCS on 8 September 1958, which made CONAD a unified command. New terms of reference for CONAD, made effective 1 January 1959, provided that CINCONAD was the senior U.S. officer in Headquarters NORAD. CINCONAD's mission and tasks remained essentially the same as in the preceding terms.* Finally, on 1 January 1959, the air defense forces were assigned to CONAD, and Air Force executive agency control was ended and control transferred to the JCS.

STAFF REORGANIZATION

Following passage of this act, a plan was prepared in Colorado Springs to reorganize the NORAD/CONAD headquarters to assume the new responsibilities and functions, such as logistics authority. The first plan divided the headquarters into a NORAD and CONAD side, each with a chief of staff and four deputies. This was dropped as too cumbersome and a new plan prepared that merged NORAD/CONAD into one headquarters with seven deputies. The U.S. members of the combined staff were to handle business that was strictly CONAD.

The seven-deputy staff proposed by this plan was modeled after the Joint Staff of the JCS. The JCS Joint Staff had six "J" staff sections and a joint programs office. The NORAD/CONAD staff was to have six "J" sections and a deputy for programs.

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- * The CONAD Terms were rescinded in February 1961 as no longer necessary. Guidance on functions and responsibilities was provided by a revised Unified Command Plan, the Joint Strategic Capabilities Plan, and periodically-issued directives and instructions.



The final plan was submitted in March 1959. Besides the seven deputies, the plan called for an office of information, a secretariat, and a protocol office. The staff was further broken down into 30 directorates. The current organization had three deputies, a secretariat, an office of information, and was subdivided into 18 directorates.

The JCS approved the plan in a memo dated 23 June 1959. But they authorized a personnel increase of only half of the number requested. Currently, NORAD/CONAD was authorized 445 spaces (including 35 Canadian spaces). A total authorization of 966 was asked, or an increase of 521. The JCS authorized an addition of 223 for a total of 668. Most of the additional people were to come from the components. The JCS directed that the transfer of personnel and the assumption of additional functions were to be accomplished in phases and in coordination with the Services.

In the plan which was approved by the JCS, it was stated that the NORAD/CONAD functions included the following:

a. The establishment of qualitative and quantitative requirements for all forces, weapons and equipment for air defense of the North American continent.

b. Planning for the deployment and re-deployment of assigned forces and forces to be made available.

c. The establishment of tactics, procedures and methods for exercising operational control of forces assigned, attached or otherwise made available and for directing the engagement and disengagement of weapons; recommending plans for the operational use of all allocated forces, weapons and equipments and making recommendations concerning present and/or proposed North American air defense concepts.





d. Making recommendations concerning the technical compatibility of all air defense systems and the proper time-phased integration of new or modified weapons into the air defense environment.

The JCS advised that personnel functions of CONAD, with respect to the components, were limited to the establishment of policies to insure uniform standards of military conduct. Direct training responsibility was to be limited to joint training. NORAD/CONAD functions in weapons and environment systems development and testing were to be limited to preparing qualitative and quantitative requirements, making recommendations for resolution of unsatisfactory situations to the JCS, and working with the Service with development responsibility to include representation at operations test conferences, provision of observers during test operations, and review of test reports.

A committee formed to put the reorganization plan into force agreed to the following guidelines. In the areas of personnel (J-1), logistics (J-4), and programs, the headquarters would concern itself only with monitoring and providing broad command guidance and policy. This was not true in the remaining J staff areas of intelligence (J-2), operations (J-3), plans and policy (J-5), and communications and electronics (J-6). The latter areas were considered to be of primary concern to NORAD/CONAD.

General Partridge approved the committee's plan including the phased buildup of personnel, and on 3 August 1959 the new seven-deputy organization went into effect. Separate general orders established the staff structure for NORAD and CONAD. They were identical except for the position of Deputy Commander-in-Chief included on the NORAD staff.



REGIONS AND SECTORS

Still needed were separate, independent, NORAD/CONAD-manned subordinate organizations. As stated before, when CONAD was established in 1954, it was superimposed on the existing USAF ADC structure from command headquarters down through division level. Later, CONAD Headquarters was separated from ADC Headquarters. But the situation remained essentially the same below the command headquarters level. ADC subordinate organizations still served as the CONAD organizations and the NORAD organizations as well.

In January 1957, CONAD renamed its joint defense forces "regions" and its joint divisions "divisions." Then in June, it sent a proposed manning plan for its regions and divisions to the JCS. In retrospect, it is obvious that this was an ill-conceived plan mainly because it was premature. It required a large number of people and provided for the three U.S. regions and 16 U.S. divisions then in existence. In all, about 2,000 spaces would have been required. CONAD was on the eve of reorganizing its structure to accommodate the SAGE system which would establish more regions eliminate divisions, move headquarters and boundaries, etc.

The problem was recognized, however, and almost immediately NORAD recalled its plan. Then came the reorganization act of 1956 and attention was concentrated on reorganizing the NORAD/CONAD Headquarters. Not until this was completed did NORAD/CONAD turn back to the problem of manning its subordinate commands.

During 1959 this was worked on and in February 1960, a second organization and manning plan was submitted to the JCS. It covered only the regions on the U.S. mainland and did not mention sectors. Alaskan Region was left to the organization wishes of Commander-in-Chief Alaska and



Northern Region was organized separately.*

The manpower requirements were much less than those proposed in 1957. Now, for the seven region headquarters, a total of 479 spaces was asked.

Again, a reorganization of the command structure intervened. A month after the plan was submitted, USAF Headquarters announced drastic reductions in programmed air defense equipment. Among these was cancellation of the SAGE super combat center. Because of these cuts, especially the latter, NORAD revised its plan for its subordinate organizational structure. Among the changes was reduction to six regions in the U.S.

Because of this, the JCS returned the region headquarters plan and asked for a revision in accordance with the planned changes and also for a sector headquarters plan.

A new plan, which included the sectors, was submitted on 28 October 1960. It covered six regions and 21 sectors planned for the U.S. mainland.

On 3 April 1961, the JCS approved this plan. The new headquarters were established on 1 August 1961. Region headquarters now became integrated joint staffs. However, because of the shortage of general officers, there still remained a dual-role arrangement for the command positions. The region commander, by prior agreement with and approval by CINCNORAD, could be additionally designated as the commander of his service component. In one region, the 28th, an Army general officer was appointed commander. He also commanded the

* An Alaskan NORAD/CONAD Region Headquarters was organized on 1 February 1962, staffed on a dual-capacity basis. All positions, except that of the commander (CINCAL), were manned by AAC and USARAL personnel.



6th Region ARADCOM. The other five regions were commanded by USAF general officers. The deputy commander positions at region were made additional-duty slots for component commanders of a service other than that of the commander and were not carried on the NORAD Joint Table of Distribution. In the 25th, 29th and 30th Regions, Canadian officers were appointed second in command and named vice commanders. A U.S. deputy commander position was then established under the vice commander in these regions.

The new NORAD region headquarters were small, containing only one major staff section -- that of the deputy for operations -- and offices for information and administration. The total manpower authorization for the six region headquarters was 363. This has since been revised slightly.

On the sector staffs, 366 NORAD personnel were originally authorized. Here, only 86 were U.S. spaces, consisting of 63 USAF, 11 Army and 12 Navy. The remaining 280 were RCAF spaces. This also has been revised since.

APPENDIX



APPENDIX I

IMPORTANT ACTIONS

IN AIR DEFENSE

1945

21 December - Alaskan Air Command activated at
Davis Field, Alaska.

1946

27 March - AAF Air Defense Command activated at
Mitchel Field, New York.

15 August - First post-war interceptor unit as-
signed to Alaska, the 57th Fighter-
Interceptor Group.

First post-war radar units formed
in Alaska, the 629th ACW Squadron at
Davis, and the 626th ACW Squadron at
Shemya.

1947

1 January - Alaskan Command established by the
JCS as a unified command at Elmendorf AFB.

21 May - First post-war ACW organization
activated in the U.S. -- the 505th
ACW Group at McChord AFB, Washington.

26 July - Department of the Air Force created.
(First Air Force Secretary sworn in
on 18 September 1947.)

15 November - U.S. Army Alaska and Alaskan Sea
Frontier formed.



1947

- 17 December** - USAF granted authority to ADC to use fighter and radar forces of SAC, TAC, and the Air National Guard in an emergency.

1948

- 21 April** - Secretary of Defense order, following Key West Agreement, assigned Air Force primary responsibility for air defense.
- 30 April** - First radar unit on East Coast of U.S. formed -- the 503d ACW Group at Roslyn AFB, New York.
- May** - First antiaircraft unit arrived in Alaska, the 887th AA Battalion.
- 25 October** - First air defense division organization established, the 23th Air Division, at Silver Lake (Everett), Washington.
- 16 November** - First division on East Coast formed, the 26th Air Division, at Mitchel Field, New York.
- 1 December** - RCAF Air Defence Group formed at Air Force Headquarters, Ottawa (moved to St. Hubert, P.Q., on 1 November 1949).

First post-war RCAF interceptor squadron formed, 410th Squadron.

USAF established the Continental Air Command and placed ADC and TAC under it as operational commands.



1949

- 21 March** - Congress approved a large radar program for the U.S. and Alaska, the Permanent Radar Program.
- 1-30 June** - Operation Blackjack held, first air defense exercise in the Northeast.
- 1 September** - Eastern and Western Air Defense Forces activated by ADC.
- 23 September** - President Truman announced that Russia had exploded an atomic bomb.
- 2-14 November** - Operation Drummerboy held, first large-scale air defense exercise in the Northwest.
- 20 December** - First agreement between an air defense force of ADC and a Navy sea frontier (EADP and Eastern Sea Frontier) for Navy participation in emergency air defense.

1950

- 1 February** - Continental Air Command directed by USAF to establish a Civil Air Raid Warning System.
- 8 April** - ConAC authorized to begin limited intercept for identification with armed fighters.
- 26 May** - First jet radar-equipped interceptor, the F-94A, assigned to an ADC squadron.
- 1 June** - ConAC directed to establish a Military Air Raid Warning System.



1950

- 1 June** - ConAC authorized to establish a Ground Observer Corps (informally authorized the preceding February).

First Canadian-U.S. Emergency Air Defense Plan.
- 25 June** - Start of war in Korea.
- 27 June** - Air defense systems of U.S. and Alaska began around-the-clock operations.
- 1 July** - Army Antiaircraft Command Headquarters formed by U.S. Army at the Pentagon.

USAF Air Defense Command was discontinued.
- 19 July** - Regulations issued by Air Force, Army, and Navy established air defense identification zones (made applicable to civilian traffic by CAA regulation of 27 December 1950).
- 1 August** - Collins-Vandenberg Agreement (Army and Air Force Chiefs of Staff) provided rules for operational control of Army antiaircraft forces.
- 24 August** - President authorized interception and engagement of aircraft anywhere in the U.S.
- 1 September** - ARAACOM regional commands, Eastern and Western, created.
- 1 October** - U.S. Northeast Command established by JCS, and Northeast Air Command established by USAF, with headquarters at Pepperrell AFB, Newfoundland.



1950

- 22 December** - Navy began arrangements to have two picket ships available on 24-hour notice for duty in an emergency off the East Coast.

1951

- 1 January** - Air Defense Command re-established at Mitchel Field, New York (opened at Ent AFB, Colorado, on 8 January 1951).
- 15 January** - ARAACON Headquarters moved to Colorado Springs, from Mitchel AFB, New York.
- 1 February** - Fifteen ANG fighter squadrons federalized and assigned to ADC (six more ANG squadrons assigned on 1 March).
- 1 March** - ADC activated its third defense force, Central, at Kansas City, Missouri.
- 10 April** - ARAACON assumed, for the first time, command of all antiaircraft forces allocated to air defense in the U.S.
- 21 April** - First formal agreement made by ADC with another Air Force command for use of its forces in an emergency (signed with Tactical Air Command).
- 24 April** - ARAACON established its third regional command, Central.
- 1 June** - RCAF Air Defence Group redesignated as the Air Defence Command.



1951

- 1 July** - RCAF ADC began establishment of a national organization with the formation of the 12th Air Defence Group at Vancouver, B.C.
- 10 July** - Second major radar program for U.S. approved by USAF, the Mobile Radar Program.
- 1 August** - Exchange of notes constituted formal U.S. and Canada agreement for the building of Pinetree Radar System in Canada.

1952

- 10 March** - First Multiple Corridor System for identification of traffic coming in from overseas placed in operation, outside of San Francisco.
- 27 May** - Basic construction on the Permanent Radar System completed.
- 1 July** - Federal Civil Defense Administration took over the operation of the Civil Air Raid Warning System.
- 14 July** - Start of Ground Observer Corps Operation Skywatch -- 24-hour operation of posts.
- 15 July** - Plan for the Security Control of Air Traffic signed by the Secretary of Defense and Secretary of Commerce.
- 24-28 July** - Operation Sigupost held, first nation-wide air defense exercise in the U.S. (RCAF ADC also conducted an exercise -- from 19-28 July).



1952

- 23 September** - Navy picket ship placed on around-the-clock duty for first time -- off East Coast.
- 1 October** - First Canadian Ground Observer Corps units organized.

1953

- 7 March** - First rocket-bearing interceptor, the F-94C, assigned to an ADC squadron.
- 1 April** - First CF-100 squadron formed by the NCAF ADC.
- 10 April** - USAF adopted the Semi-Automatic Ground Environment (SAGE) System developed by M.I.T.'s Lincoln Laboratory.
- 13 April** - Last station of U.S. Permanent Radar System became operational.
- 21 April** - NCAF ADC and Northeast Command signed agreement giving operational control of U.S. air defense forces in Canada to AOC NCAF ADC.
- 8 October** - Canada-U.S. Military Study Group recommended establishment of a warning line along the 55th parallel -- led to building of the Mid-Canada Line.
- 17 December** - First operational missile unit in ARAACOM moved on site at Ft. George G. Meade, Maryland, the 1st Missile Battalion, 562d Artillery.
- 24 December** - Air Force-Navy agreement signed on forces and control for seaward extension of radar for contiguous system and DEW Line barriers.

1954

- 11 January** - USAF approved a third major radar program for the U.S., the low-altitude gap-filler radar program. USAF also approved the building of five Texas Towers off the Atlantic Coast.
- 24 February** - President approved recommendation of National Security Council that a Distant Early Warning Line be built. Canada approved in late 1954.
- 1 May** - Russia displayed a jet bomber for the first time.
- 18 May** - First meeting of the combined Canada-U.S. ADC's Planning Group.
- 30 June** - Canadian Government agreed to build the Mid-Canada Line.
- 6 July** - The last piston-engine interceptor removed from USAF ADC force.
- 15 August** - Air National Guard began placing aircraft on alert (eight locations at this time).
- 1 September** - Continental Air Defense Command established by the JCS at Ent AFB, Colorado, as a joint command for air defense of the continental U.S.

Naval Forces CONAD established at Ent AFB -- the Navy component command of CONAD.

1955

- 15 January** - All Pinetree System radar stations were operating.



1955

- 15 February** - USAF ADC interceptor force completely converted to jet all-weather interceptors.
- 8 October** - USAF ADC structure increased to 16 divisions with activation of 20th Air Division at Richards-Gebaur AFB, Missouri; this organization remained until the start of SAGE operation and the necessary reorganization.
- 1 December** - Navy began placing fighter aircraft on air defense alert at San Diego, California.

1956

- 22 January** - JCS approved in principle a recommendation of the USAF Chief of Staff that there was a need for peacetime integration of the operational control of the Canadian-U.S. air defense forces.
- April** - First supersonic, century series aircraft, the F-102A, assigned to a USAF ADC squadron, the 327th.
- 3 July** - JCS Revised Unified Command Plan issued; provided for abolition of the U.S. Northeast Command and assignment of responsibility for air defense of the Northeast and of Alaska to CINCONAD, effective 1 September 1956.
- 1 September** - CINCONAD assumed responsibility for air defense of Alaska and Northeast Area.

U.S. Northeast Command discontinued by JCS.



1956

- 4 September** - New terms of reference for CONAD provided for enlargement of responsibility and for a change in organization including separation of CONAD and ADC Headquarters.
- 17 September** - A new staff structure for a separate CONAD Headquarters was established.
- December** - First nuclear-armed aircraft delivered to USAF ADC -- F-80J equipped with MB-1 rockets (84th FIS, Hamilton AFB, California).

1957

- 1 April** - USAF Northeast Air Command inactivated.

64th CONAD Division established at Pepperrell AFB, Newfoundland, became CONAD's subordinate command in Northeast area for exercising operational control of air defense forces.
- 1 July** - Atlantic DEW Line Sea Barrier became fully operational.
- 15 July** - DEW Line from Cape Dyer, Baffin Island to Cape Lisburne, Alaska, declared technically ready.
- 13 August** - DEW Line dedicated by the Air Force.
- 12 September** - North American Air Defense Command established with headquarters at Ent AFB, Colorado.
- 4 October** - Sputnik I, the first man-made earth satellite, launched by the U.S.S.R.

1957

- 5 December** - First Army Missile Master became operational, located in the Washington-Baltimore area, under 35th Air Defense Artillery Brigade.

1958

- 1 January** - U.S. Ground Observer Corps reduced from 24-hour to ready-reserve status.
Mid-Canada Line declared fully operational.
- 14 January** - Secretary of Defense authorized the Air Force to proceed immediately with development of a ballistic missile early warning system.
- 12 May** - Exchange of notes between Canada and U.S. constituted formal agreement on establishment of NORAD.
- 15 May** - First NORAD Control Center, located at Geiger Field, Washington, became operational.
- 10 June** - Terms of reference for NORAD assigning it the mission of defending the continental U.S., Canada, and Alaska against air attack.
- 26 June** - First SAGE sector, New York, became operational.
- 30 June** - First LIMBURN unit became operational with Nike Hercules, Battery A, 2d Missile Battalion, 57th Artillery, near Chicago.
- 1 July** - Pacific Sea Barrier became fully operational.



1958

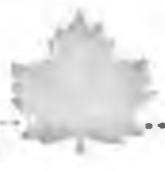
- 8 September** - New Unified Command Plan issued by JCS making CONAD a unified command responsible to the Secretary of Defense and JCS.
- 23 September** - Canada's Prime Minister announced that the CF-105 "Arrow" would not be put into production.
- 1 December** - Termination of executive agency control of Alaskan command by Air Force and transfer to control of JCS.
- 31 December** - New terms of reference for CINCOMAD as commander of unified command (effective 1 January 1959).

1959

- 1 January** - Termination of executive agency control of CONAD by the Air Force and transfer of control to the JCS.

First SAGE division became operational, the 26th, Syracuse, New York.
- 5 January** - USIAF advised that governments of Canada and U.S. had agreed, in principle, to a cost sharing arrangement for joint air defense program in Canada (which became known as the Continental Air Defense Integration, North (CADIN) Program).
- 31 January** - U.S. Ground Observer Corps inactivated.
- 12 March** - First Nike Hercules unit in Alaska became operational.

[REDACTED]



1959

- 18 March** - JCS approved locating new NORAD Combat Operations Center in Cheyenne Mountain, south of Colorado Springs, Colorado.
- 19 June** - Secretary of Defense provided new air defense program, Continental Air Defense Program; it included cuts in BOMARC and SAGE programs.
- 23 June** - JCS approved NORAD/CONAD Headquarters reorganization plan, which was prepared in accordance with Defense Reorganization Act.
- 1 August** - Eastern NORAD/CONAD Region discontinued and 26th, 30th, and 32d Divisions designated regions -- start of replacing of geographically designated regions with numerically-designated regions under SAGE reorganization.
- 17 August** - Canadian Cabinet Defence Committee approved, in principle, Canadian participation in NORAD region and sector headquarters.
- 25 August** - JCS established a uniform system of programming alert procedures for use by 27th and 31st and 32nd and 33rd Divisions, and by the 34th and 35th Divisions. (DTCOMS).
- 1 September** - First NORAD Squadron, 46th Air Defense Squadron, McGuire AFB, N.J., became operational.
- 14 September** - DOD authorized Air Force to implement third SAGE site, to be located in the U.S.



1950

- 23 September** - USAF stopped development of the F-108 long-range interceptor.
- 1 November** - Northern NORAD Region Headquarters in Canada organized, first region headquarters organized and named.

1960

- 1 January** - Central NORAD/CONAD Region discontinued and the 29th and 33d NORAD/CONAD Divisions redesignated as regions.
- 26 March** - Navy picket ships withdrawn from Atlantic DEF Line Barrier.
- 30 March** - USAF advised of extensive cuts in the program for air defense equipment to meet the manned bomber threat, including reduction of BOMARC squadrons and cancellation of SAGE Super Combat Centers.
- 1 April** - NORAD/CONAD discontinued 64th Division at Pepperrell AFB, Newfoundland (because of Air Force decision to close down this base) and set up Goose Sector to handle operations, with headquarters at Melville Bay, Labrador.

Navy picket ships withdrawn from Pacific DEF Line Barrier.
- 15 May** - 25th and 5th NORAD Divisions merged; 25th assumed operational control of units in 5th's area; 5th Division was discontinued.
- 1 June** - Canadian Ground Observer Corps south of the 55th parallel was disbanded.


1960

- 15 June** - Last gun battalion in ARADCOM inactivated, the 2d Gun Battalion, 68th Artillery.
- 1 July** - Western NORAD/CONAD Region discontinued and 25th and 28th NORAD/CONAD Divisions redesignated as regions. This established a seven-region structure on the U.S. mainland -- the original goal of the SAGE reorganization.
- USAF ADC reached a seven SAGE division structure.
- 28 July** - ARADCOM added a sixth region to its structure, the 7th Region, USARADCOM, with headquarters at McChord AFB, Washington.
- 10 September** - Exercise Skyshield held first continent-wide exercise under NORAD direction and first grounding of all non-exercise air traffic in U.S. and Canada.
- 16 September** - JCS approved NORAD recommendation for operational control of Air Force Bomb Alert System.
- 30 September** - BMEWS Site 1, Thule, Greenland, detection radars reached initial operational capability -- first operation of BMEWS.
- 7 November** - JCS gave NORAD operational control and CONAD operational command of the Space Detection and Tracking System.
- 1 December** - Air National Guard squadrons picked by NORAD and ADC for a Category I (24-hour ready) role approved by the JCS.
- 

1961

- 1 March** - The last Army National Guard unit traded its guns for the Ajax missile -- making the ARNG completely missile-armed.
- 12 April** - Russian cosmonaut Yuri Gagarin made orbit around the earth once in first space flight by man.
- 18 May** - Excavation began for the NORAD hardened COC in Cheyenne Mountain south of Colorado Springs.
- 23 May** - The Office of the Secretary of Defense approved nuclear weapons for the ANG Category I squadrons.
- 1 June** - The first squadron with improved BOMARC ("B's") became operational.
- 5 June** - Secretary of Defense directed that further SAGE air battle augmentation be stopped and the money saved and subsequent funding used to provide a survivable backup control system (termed EUIC - Back-Up Interceptor Control).
- 12 June** - SPADAT operations center at Ent Air Force Base became operational.

Canadian-U.S. governments agreed on a transfer of 66 F-101B aircraft from USAF ADC to RCAF ADC (first one delivered in October).
- 30 June** - BMESS Site 2, Clear, Alaska, detection radars reached initial operational capability providing NORAD with a two-site detection capability.



1961

- 1 July** - The basic Mark X IFF was discontinued in the continental aircraft control and warning system.
- 1 August** - NORAD plan for the organization and manning of NORAD/CONAD region and sector headquarters (excluding those in Canada and Alaska) was implemented.
- NORAD/CONAD, USAF ADC, and ARADCOM achieved six major subordinate commands in the CONUS each and common boundaries.
- G-I-UK Line became operational.
- 23 August** - JCS approved NORAD requirement for a CW/BW rapid warning system.
- 1 October** - First of the Pinetree stations manned in the past by USAF ADC handed over to the RCAF.
- 12 October** - First F-101 delivered to an RCAF squadron -- 425th (formerly the 432d) at Nampa.
- 14 October** - Exercise Sky Shield II held -- second continent-wide exercise held by NORAD.
- November** - ARADCOM achieved its program of 135 Hercules-equipped RF fire units.

1962

- 1 February** - Alaskan NORAD Region Headquarters organized.
- 13 March** - Secretary of Defense approved two-phased EUC implementation plan.



1962

- 10 April** - 30th NORAD Region, Truax Field, Wisconsin, designated as secondary NORAD ALCOP.
- 3 August** - Secretary of Defense approved a limiting of military requirement for CONELRAD.
- 1 September** - Bomb Alarm System declared operational.
- 2 September** - Exercise Sky Shield III held -- third continent-wide exercise held by NORAD.
- 22 October** - CONAD increased its weapons readiness status and declared DEFCON 3 because of Cuban crisis -- remained on increased alert until 27 November (NORAD declared DEFCON 3 on 26 October). CONAD increased radar and weapons force in Florida area and dispersed part of interceptor force in U.S.
- 1 December** - Ten squadron NORAD BOMARC program completed with operation of 447 Sqn Squadron, LaMacaza, Quebec.



APPENDIX II

ROSTER OF KEY COMMANDERS

AAF/USAF AIR DEFENSE COMMAND

Lt Gen George E. Stratemeyer....Mar 48-Dec 48
Maj Gen Gordon P. Saville.....Dec 48-Sep 49

CONTINENTAL AIR COMMAND

Lt Gen George E. Stratemeyer....Dec 48-Apr 49
Lt Gen Ennis C. Whitehead.....Apr 49-Dec 50

USAF AIR DEFENSE COMMAND

Lt Gen Ennis C. Whitehead.....Jan 51-Aug 51
Gen Benjamin W. Chidlaw.....Aug 51-May 55
Maj Gen Frederic H. Smith, Jr...May 55-Jul 55
Gen Earle E. Partridge.....Jul 55-Sep 56
Lt Gen Joseph H. Atkinson.....Sep 56-Feb 61
Lt Gen Robert H. Lee.....Mar 61-

ALASKAN AIR COMMAND

Brig Gen Edmund C. Lynch.....Dec 45-Oct 46
Brig Gen Joseph H. Atkinson.....Oct 46-Feb 49
Brig Gen Frank A. Armstrong.....Feb 49-Dec 50
Maj Gen William D. Old.....Dec 50-Oct 52
Brig Gen W. R. Agee.....Oct 52-Feb 53
Maj Gen George R. Acheson.....Feb 53-Feb 56
Lt Gen Joseph H. Atkinson.....Feb 56-Jul 56
Maj Gen Frank A. Armstrong.....Jul 56-Oct 56
Maj Gen James H. Davies.....Oct 56-Jun 57
Maj Gen Frank A. Armstrong.....Jun 57-Aug 57
Brig Gen Kenneth H. Gibson.....Aug 57-Aug 58
Maj Gen C. F. McCrason.....Aug 58-Jul 61
Maj Gen Wendell W. Bowman.....Jul 61-

ALASKAN COMMAND

Maj Gen Howard A. Craig.....Jan 47-Aug 47
Lt Gen Nathan P. Twining..... 47- 50
Lt Gen William E. Kepner..... 50- 53
Lt Gen Joseph H. Atkinson..... 53-Jul 56
Lt Gen Frank A. Armstrong.....Jul 56-Jul 61
Lt Gen George W. Mundy.....Jul 61-

BCAF AIR DEFENSE GROUP/AIR DEFENSE COMMAND

G/C W. R. MacBrien.....Dec 48-May 51
A/V/M C. E. Dunlap.....Jun 51-Jul 51
A/V/M A. L. James.....Aug 51-Sep 54
A/C C. L. Annis.....Sep 54-Jan 55
A/V/M L. E. Wray.....Jan 55-Aug 58
A/V/M W. R. MacBrien.....Aug 58-Sep 62
A/V/M M. M. Hendrick.....Sep 62-

ARMY ANTIAIRCRAFT COMMAND/ARMY AIR DEFENSE COMMAND

Maj Gen Willard W. Irvine.....Jul 50-May 52
Lt Gen John T. Lewis.....May 52-Sep 54
Lt Gen Stanley R. Nickelson.....Oct 54-Oct 57
Lt Gen Charles E. Hart.....Nov 57-Jul 60
Lt Gen Robert J. Wood.....Aug 60-May 62
Lt Gen William W. Dick, Jr.....May 62-

UNITED STATES NORTHEAST COMMAND and NORTHEAST AIR COMMAND

Maj Gen Lyman P. Whitten.....Oct 50-Mar 52
Maj Gen Charles T. Myers.....Mar 52-Jul 54
Lt Gen Glenn O. Barcus.....Jul 54-Sep 56

NORTHEAST AIR COMMAND

Lt Gen Glenn O. Barcus.....Sep 56-Apr 57

NAVAL FORCES CONTINENTAL AIR DEFENSE COMMAND

RADM Albert K. Morehouse.....Sep 54-Dec 55
Capt Dennis J. Sullivan.....Dec 55-Apr 56
RADM Hugh E. Goodwin.....Apr 56-May 57
Capt John G. Howell.....May 57-Jul 57



NAVAL FORCES CONTINENTAL AIR DEFENSE COMMAND

Capt George L. Kohr.....Jul 57-Sep 57
RADM Walter F. Bodee.....Sep 57-Apr 60
RADM Thomas A. Ahren.....Apr 60-

CONTINENTAL AIR DEFENSE COMMAND

Gen Benjamin W. Chidlaw.....Sep 54-May 56
Lt Gen Stanley R. Nickelson.....May 56-Jul 56
Gen Earle E. Partridge.....Jul 56-Jul 59
Gen Laurence S. Enter.....Aug 59-Aug 63
Gen John E. Gerhart.....Aug 63-

NORTH AMERICAN AIR DEFENSE COMMAND

Gen Earle E. Partridge.....Sep 57-Jul 59
Gen Laurence S. Enter.....Aug 59-Aug 63
Gen John E. Gerhart.....Aug 63-

DISTRIBUTION

COSC	1.	<u>REDISTRIBUTED BY HQ NORAD</u>	
JCS	2	NCR	1
USAF (AFCD)	1	NAPA	1
CAS, RCAF	2	NINT	1
RCAF ADC	1	NIFO	1
USAF ADC	1	NOPS	1
ARADCON	1	NOSP	1
NAVFORCONAD	1	NOSV	1
NORAD Regions	3 each	NOST	1
NORAD Sectors	1 each	NOC	1
HQ NORAD	45	NOD	1
TOTAL	100	NOC	1
		NOC	1